

MAN'S WAY

*from Cave
to Skyscraper*



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to Skyscraper*

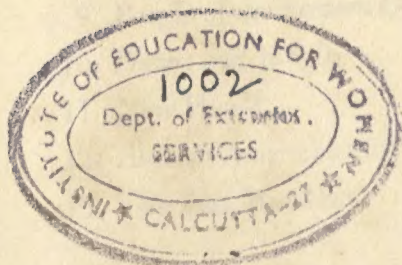
MAN'S WAY

from Cave
to Skyscraper

BY RALPH & ADELIN LINTON

Illustrated by

Raine Renshaw



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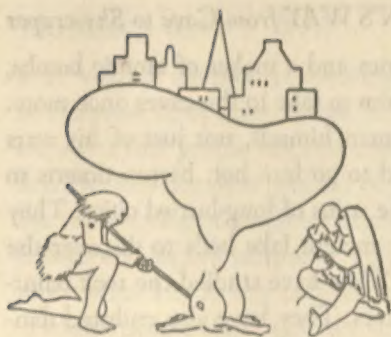
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Chapter 1

TRACING MAN'S WAY

"The proper study of mankind is man," wrote Alexander Pope over two hundred years ago. Men have always been interested in themselves, and philosophers, from the Greeks on down, have done a lot of speculating about the nature of man and where he came from. It is only in the past hundred years, however, that we have set to work in a truly scientific manner to find out about ourselves. This was a task which couldn't be done by philosophers or by delvers into old books in libraries, for man's history began many thousands of years before he learned to keep any sort of written record. And even after he had devised a system of writing, the few scholars who knew how to use it wrote only of battles and kings and great events, not about how the people lived and worked and thought.

This book is the story of man's beginnings and of the devious roads he has traveled during the centuries in which he has been changing from a creature living in caves to a builder of towering

skyscrapers and soaring airplanes and a maker of atomic bombs, which are capable of forcing him to take to the caves once more.

To discover the history of man himself, not just of his wars and heroes, scientists have had to go into hot, barren deserts to dig in the shifting sands for the ruins of long-buried cities. They have combed the dried silt of ancient lake beds to discover the bones of prehistoric creatures. They have studied the rock paintings on the walls of ancient caves. They have also endured danger and hardship in order to go out and live among savage peoples, for in order to understand ourselves we need to know how people in societies very different from our own have lived and solved their problems. The scientists who do this sort of research are called anthropologists. The word anthropology comes from the Greek and means "study of man."

Most scientists make their findings in laboratories where they can control the subject of their study and check their results, but the anthropologist can't put human beings under microscopes, breed them like rabbits, or put them through mazes like rats. His substitute for the laboratory is the primitive community where he can observe human beings living under all sorts of conditions very different from our own. To study such people the anthropologist considers it worth-while to risk having his head shrunk as a trophy for Jivaro head-hunters or becoming the main course of a New Guinea cannibal feast.

We call such communities "primitive" because the people who live in them have not learned to use machines and their ways of life are more like those of our ancestors a few hundred years ago than they are like our own. Patterns of living are much simpler and the knowledge which goes with these patterns is shared and understood by everybody. Our own society today is so complicated that we who live in it can know and understand only a small part of it. In making any sort of scientific study it is best to

start with the simplest phenomenon of a particular sort and go on to the more complicated ones. A study of primitive communities shows us that people can live under all sorts of conditions which don't fit into our own concept of good living. The more societies the anthropologist studies, the more proof he finds that human beings are highly adaptable and that human nature is pretty much what any society chooses to make it.

Many people think that the differences in the way people do things in different parts of the world are due to differences in race. Actually, race has very little to do with the case. For example, back in pioneer days, when the Indians were still strong enough to raid the frontier settlements, they often carried off white children. These children were adopted into Indian families and were so well treated there that if they were rescued or returned to their parents through an exchange of prisoners, the white children had to be watched to prevent them from running away back to their adopted Indian parents.

The white children who grew up with the Indians became Indian in everything except the color of their skin. They had all the special skills and all the superstitions of the red men, including their hatred of white people. The early settlers marveled at the way the Indian could move through the forest so silently that not a twig cracked, shoot a wild duck on the wing with a bow and arrow, and handle a canoe in wild water. They considered these feats as abilities which were an Indian inheritance, but the kidnapped white children became equally expert at all these things. They also learned the pride and stoicism of the Indian, fasted in Indian fashion to get a spirit guardian, and believed in that spirit as thoroughly as any other Indian brave.

Many years ago in the Southwest we knew a medicine man of the Apache tribe, who had bright red hair, blue eyes, and freckles on his snub nose. However, he had the dignified bearing, the ex-

pert horsemanship, and the poker face of a Plains Indian. He also had a firm belief in the spirits with whom he had talked in dreams. He told us, through an interpreter, for he spoke very little English, that his parents had been Irish immigrants. He had been kidnapped as a small child and adopted by an Apache family in place of their dead son. He was completely Indian in his loyalties and highly contemptuous of whites. The only things that distinguished him from the rest of the tribe were that he carried "the map of Ireland" on his face and that he always wore a green blanket instead of a red one because some trader with a sense of humor had convinced him that he should.

The idea that the special qualities of different groups are due to their racial differences is a very persistent one. People say that the Plains Indians were warlike because they were naturally daring and courageous; that the Eskimos seldom fight because they are mild by nature. What really lies back of these differences is that the Plains Indians had to fight to protect themselves against marauding neighbors, while the Eskimos live in a land so cold and inhospitable that no one bothers them and they can afford to be peaceable.

Since, for the Plains Indians, fighting was so necessary for survival, all the best rewards the society had to offer went to the good fighters. Boys were trained to be warriors and applauded for bold acts and never punished for fear it might break their spirit. That the system was successful in its aims was shown by the amount of trouble these tribes gave the whites, in spite of the superior numbers and equipment of the latter. Man for man, the Plains Indians were probably as good fighters as the world has ever seen.

This story was told us by Tenawerka, a Comanche friend who was a very old man when we knew him. In the eighteen eighties, his band of Comanches were the last of the hostile Indians still at large. There were less than eighty men in the band and they

were being pursued by about four thousand United States soldiers. One night Tenawerka and his friend, White Horse, decided to have a last fling before they surrendered. They stole through the lines at Fort Sill, got into the corral where the cavalry horses were kept, opened the gate, and stampeded the horses. Beyond the lines of the fort, they rounded them up and drove them across the country. Every time they met a white man, they presented him with a few horses. It took the army weeks to recover its mounts. The Comanches knew that the game was up and they did not really want the horses. They merely wanted to show the United States Army what a couple of Comanches could do.

This was the kind of men the Plains tribes produced. However, the bravest Comanche would have turned green with terror if he had had to accompany an Eskimo on a walrus hunt in a little skin boat, for the Plains people had no knowledge of boats and were afraid of them. All people have the courage to meet the situations for which they are trained. Whether they strive for war honors or for wealth or for wisdom, whether they are fierce or mild, are all matters of what things their societies value most and how they have been trained as children.

Although a man's personality and abilities depend upon what he has learned, what he can learn depends upon what his society has to teach him. For instance, a South Sea Islander cannot learn about automobiles until white men bring them to his country. However, once he has been able to get his hands on a car, he can become as good a mechanic as a white man in a very short time. What a society has to offer its members in the way of knowledge and techniques depends upon the society's history: the things which its long-dead members have invented or learned from other societies, the ideas which they have held and passed on and what they considered important.

Unfortunately, history does not tell us many of the things we need to know to get a clear picture of the past. Writing does not go back more than six thousand years anywhere in the world, and there are great areas where there was no writing at all until two or three generations ago. Also, as we have said before, early histories were written about kings and priests and wars and tell us very little of the lives of common men. To fill out this record, there is a special branch of anthropology called archeology, which takes over the work of history whenever written records leave off.

We hear more about archeology than about any other kind of anthropology. Whenever an archeologist hits a jack pot, such as the finding of the tomb of Tutankhamen in Egypt, or the dredging up of gold and jade from the sacred well of the Mayas in Yucatan, these stories get headlines and illustrations in the rotogravure sections of the newspapers. Almost everyone has dreamed of digging in the ruins of an ancient temple and finding a gold idol with jewels in its eyes. There is even a certain thrill in picking up an arrowhead in a newly-plowed field. Actually, the sort of discoveries that are written up in the Sunday supplements are very rare indeed. Even when they are made, such "barbaric pearl and gold" tell us less of what anthropologists want to know than may be learned from a broken jar with the remains of a meal in it or from the little clay toys which some sorrowing mother put in her child's grave.

Digging is only the first part of the archeologist's work. Like a detective who reconstructs a crime from a fingerprint and a cigarette butt, the archeologist takes bits of broken pottery, lost tools, and paintings on crumbling walls and reconstructs from these things the way the people lived and what they thought in cities which have been buried under dust and drift sand for many centuries. Where his work overlaps that of history, sometimes he proves the written records wrong, and always he adds things that

the historians did not mention. With this greater understanding of the past, we are beginning to see more and more clearly why the people living in different parts of the world are as they are today.

To show the way of man in his struggle for civilization and his building of the mighty and complicated world society in which we now live, we have drawn on the work of the archeologist and the historian, and have used the knowledge gained from study of living "primitive" groups to help us understand why things happened as they did. We know now that in man's climb toward civilization there have been many roads leading upward and many different goals which different groups thought worth striving for. Progress has been more rapid for some groups than for others. At certain times the torch of human achievement has burnt most brightly in the hands of brown or yellow rather than white men. To follow the development of man from his humble beginnings to his present greatness should help us to think more clearly about the problems which that greatness has brought with it. In particular, it should help us to think sanely about racial differences and the troubles arising from them. If anthropology proves any one thing it is that all races have a common origin and have very much the same potentialities. Each race has made its contribution in the past and the help of all is needed to build the future.



Chapter 2

RACES OF MANKIND

The origin of man is still unknown, although the search for our original ancestors has been going on briskly ever since Darwin presented the theory of evolution to the startled world over a hundred years ago. That the present races of mankind evolved from some lower form of life is no longer doubted by anyone who is familiar with the evidence. The structure of the human body has so much in common with that of the other animals, especially with the great apes, that no other explanation seems reasonable. The study of evolution, however, is merely the study of the mechanics of creation, the steps by which new forms of life have come into being, and makes no attempt to account for the power which created this life and directed its changes. There is no logical ground for the conflict between science and religion on this score. The evidence that man's body has evolved from lower forms does not preclude the possibility of his having a soul created by Divine Grace.

Although the anthropoid apes have been shown to be our close relatives, they are not our ancestors. The fossil remains of many species of subhuman apelike creatures have been unearthed in various parts of the world, but none of them has yet been proven to be "the missing link," the subhuman form from which our own species, *Homo sapiens*, was evolved. The quest for the missing link is a long story and one which we don't propose to tell in this book. We shall start out with *Homo sapiens*, a faraway and primitive man but, after all, a man like ourselves.

The first real man, so far as we can reconstruct him from the fragmentary evidence we have, was short and stocky with medium brown skin, a somewhat flat nose, eyes deep set under heavy brow ridges, and a sloping forehead and chin. His body, even to the hands and feet, was exactly like our own and his brain was as big as that of modern man and quite as complicated in structure. His intelligence and his ability to learn were probably as great as that of the average man today, but he had a very meager inheritance of knowledge. The use of tools and weapons of a primitive sort was probably passed on from the subhuman creatures, who had learned how to break stones and use the sharp-edged pieces for cutting and scraping, and how to use a short heavy stick for a club and a long pointed one for a spear. The subhuman creatures knew how to make use of fire when they found it, but did not know how to make it. They had probably also discovered the advantages of social living: that several families living together could offer each other help and protection, and that hunters killed more game if they banded together and had a leader to direct the hunt.

This was the meager equipment which man inherited and, since most of his time and energy was devoted simply to trying to keep himself alive, additions to knowledge came slowly and painfully. His existence was one long battle to get enough food for

himself and his children, and to protect himself from hostile animals, most of which were much bigger and stronger than he was. (In spite of the pictures in the comic strips of cave men chasing dinosaurs with clubs, all the dinosaurs were dead and gone millions of years before man appeared. However, the cave bears, saber-toothed tigers, and mammoths, which were his contemporaries, gave him plenty to worry about.)

Man seems to have appeared first in southeastern Asia. That continent was much larger than it is now, for at that time the big islands, such as Java, Borneo, and Sumatra, were joined to each other and to the mainland of Asia. Most of the islands farther south and east were joined to Australia, forming another big continent which came close to Asia at several points. Man crossed over into this southern continent in very early times. He also moved westward across Asia and into Africa. This was just at the end of the Ice Age and the melting ice-cap which covered Europe made North Africa a temperate country with good rainfall and plenty of game. True men did not reach Europe until much later, after the glaciers had melted away. A different and more apelike species, called Neanderthal man, lived in Europe at the end of the Ice Age, but when our ancestors moved in from the south, they seem to have made short work of Neanderthal man. He disappeared completely, leaving only his bones and a few of his stone tools to prove he had ever existed.

It was during the many centuries that men were spreading out into new regions and adapting themselves to different climates that the various human varieties we call races emerged. "Race" is a frequently misused word. People refer, incorrectly, to the Jewish race, the Aryan race, the French race. The term Jew applies to a religion, not a race; there are Jews of all races: Chinese Jews with slant eyes and yellow skins, Abyssinian Jews with black skins and fuzzy hair. It is even more ridiculous to use Aryan as a

racial designation. Aryan refers to a group of languages which have an Indo-European foundation. English is an Aryan language, so, technically speaking, a Negro whose native tongue is English is an Aryan. The terms French, German, American, and so forth refer to nationalities, all of which combine many racial strains within their borders.

The early students of racial origins held the opinion that there had been five different creations of men: the white, black, yellow, brown, and red. Today, however, most scientists agree that all men had a common ancestor and have evolved into the various racial stocks: Caucasian, Negroid, and Mongoloid. The Caucasians have light skins, high-bridged noses, thin lips, and straight or wavy hair. The Negroes have dark skins, flat noses, thick lips, and kinky hair. The Mongoloids have yellow or brown skins, small noses, thin lips, and coarse, straight hair. Those in eastern Asia have developed a fold of skin in the inner corner of the eye, which makes them look as though their eyes were slanted. The brown-skinned people of Malaysia and the copper-skinned Indians of America are of Mongoloid stock, as well as the yellow-skinned people of eastern Asia. The native Australians, the most primitive of all modern peoples, are usually put in a separate category of their own, because they don't really fit anywhere.

These racial stocks all sprang from a common ancestor and actually men of different races are very much alike in essentials. There is less variation between men from different parts of the world than there is between animals of the same species. All dogs had a common ancestor too, the wild jackal of the Asiatic plains, but nowhere among humans, even if we take such extreme examples as the tall, blond Swede and the short, dark African Pygmy, do we find so much variation as there is between a big woolly St. Bernard and the tiny hairless Chihuahua.

When one considers that men have been wandering over the globe for nearly half a million years, it is really remarkable that they have remained so much alike. The first men were quite close to the apes in appearance and their evolution away from the ape-like characteristics has been disharmonic; that is, some races have retained certain apelike features and discarded others, while other races have retained those features which other peoples have lost.

Whites like to think of themselves as the most highly evolved and least apelike of all humans. However, it is the Caucasian man who has hair on his chest and arms like an ape and has to shave his face every day if he doesn't want to have whiskers. The yellow and the black races have smooth skins and sparse beards. There is a tendency to regard the Negroes' dark skin color and flattened nose as somewhat apelike; however the Negroes' kinky hair and thick lips are very far removed from the ape, which has straight hair and thin lips. Thin lips are a feature which has been retained most among the Mongoloids and least among the Negroids. Thus all races have evolved equally far from their apelike forebears, but in different directions.

The first man had a brown skin, probably about the color of a present-day Tahitian, but those of his descendants who went northward into colder climes became lighter, while those who penetrated into tropical lands developed darker skins. This requires some explanation, since sunburn, after all, is not a characteristic which can be passed on from father to son or even held over from one season to the next. Most of us have to acquire a fresh tan every summer, with all the preliminary burning and peeling stages. However, we know that while some sun is a good thing, too much can be harmful. White men have to wear helmets in the tropics to ward off sunstroke, and even then they cannot stay in the hot countries too long because their pale skins expose their nervous systems to more of the sun's rays than the

system can stand. Therefore, when men moved into tropical lands, the lighter skinned members of the band would sicken and die early and not leave many offspring. The darker ones, whose skin pigment offered protection from the penetrating light, would thrive, marry dark-skinned girls, and have a lot of dark children. As this process went on for generation after generation, the entire population in that region came to have dark skins.

In the north, where the sun's rays are weaker and winter nights are long, a dark skin prevents its owner from getting as much of the violet rays of sunlight as he needs for health. Therefore, here the lighter people thrived and the dark ones became enfeebled and susceptible to disease, and consequently the people kept paling out with each successive generation.

Also, in a damp cold climate the air which humans breathe has to be warmed before it reaches their lungs. To meet this need the people who moved north developed thin, high-bridged noses, while in the south people breathed warm, tropic air through flat noses with flaring nostrils.

The Eskimos, to be sure, rather upset this theory, since they are a swarthy people in a cold climate; but they never bathe in the winter, so that part of their color is soluble when spring comes around, and since the sun shines twenty-four hours a day in their land in the summer, they get a healthy tan in that season.

Of course there are other variations which cannot be explained on a basis of climate and geography. We don't know why the Mongoloid has straight hair and the Negro kinky hair since one is as good a protection from the elements as the other. We don't know why the Mongoloid has the eye fold which makes his eyes seem to slant, as it doesn't make his sight any better. These things probably came about because certain traits became established in a racial stock just as they do in family lines. Relatives admiring a new baby will exclaim: "You'd know anywhere that the little

darling was a Cadwaller; he has the Cadwaller chin. All we Cadwallers have wide square chins." So dominant traits become fixed in any group which lives together for a long time. Early men, though they spread widely, were small in number. The entire population of the earth after men had been wandering and increasing for a quarter of a million years probably did not number as many persons as the city of New York today. Also, early men lived in small groups and married among themselves so that it was easy for "family resemblances" to develop.

We've spoken of racial stocks: Caucasian, Negroid, and Mongoloid; within these stocks are further racial divisions. There are five great races in the Caucasian stock: the Nordic in northern Europe, tall, blond people with long heads; the Alpine in central Europe, short and stocky with dark hair and eyes and round heads (Hitler himself, for all his ranting about Nordic supremacy, was an Alpine type); the Mediterranean in southern Europe, with curly dark hair, long heads, and a light build. In the Near East there is another race, the Armenoid, who are short and dark and tend to have large noses which form a continuous line from their somewhat sloping foreheads. The profiles on old Greek coins are an idealization of this type. Most of the Jews are Armenoid, although as we have said before there are Jews of every physical type; but the Christian Armenians and the Mohammedan Arabs are also Armenoid in type. Lastly, in India there is a racial stock called the Hindi, which has a deeper skin color than other Caucasians and a tall, light build.

Everyone recognizes that the United States is a melting pot, that the only true native Americans are the Indians, the rest of our families having all immigrated from various Old World countries. We are less apt to realize, however, that all other countries are also melting pots to a considerable degree. The Germans, who have made the most noise about racial purity are by no

means all Nordics with yellow hair and blue eyes, as they would have liked to make us believe. All the European racial types can be found among the present Germans and also some Asiatic types, descendents of the yellow-skinned, slant-eyed Huns and Magyars, who, after the fall of the Roman Empire, raided into what are now Germany, Austria, and Hungary. There is of course a national character: a German is different from a Frenchman, though they may have much the same ancestry a few generations back. People who live together under the same educational system, the same laws, eat the same kind of food, and share the same traditions and social customs, do come to behave and to think in the same way, and in a way different from that of their neighbors who live across the border in another country. But these differences are culturally conditioned. Culture is something which has been acquired and which can be changed from generation to generation, while race is biological and constant.

We in the United States are developing a distinct national type in spite of our mixed ancestry. It is easy to single out an American in a foreign country, even if it happens to be the country where his parents were born. He does not look or act or think like his cousins whose parents stayed in the old country. Living together and sharing the benefits of this land has welded the descendents of Italians, Germans, Norwegians, English, Poles, and what have you, into a nation with a distinct culture, but Heaven preserve us from thinking that we're a race.

The Negroes are frequently regarded as being all of one race, but actually they too are a stock with several racial divisions. The ancestors of most of the American Negroes were the Forest Negroes of the west coast of Africa. They are powerfully built people with thick lips and flat noses. There are also the Nilotic Negroes, who are extremely tall (many of the men are well over six feet) and very thin with regular features and smooth black

skins. Then there are the Pygmies, little people, the tallest of whom rarely reach a height of five feet, and the Oceanic Negroes of New Guinea and the neighboring islands. These have thinner lips and higher noses than most of the other Negroids, and their hair is bushy rather than kinky. In South Africa there is a group, the Bushmen, which scientists have found it hard to classify. They are a short, slender people with Negroid noses and lips and very kinky hair, but they have yellow skins and slant eyes.

The Mongoloids are the most difficult to describe, for this stock has been used as a catchall for most of the racial groups who do not fit into either of the other two great divisions. The most clear-cut race in this division is the Old World Mongoloid, like the Chinese and Japanese with their yellow skins, slant eyes, small straight noses, and coarse black hair. Then there are the Malays of southeastern Asia and the near-by islands, who have brown skins and, very often, straight eyes. The Polynesians of the Pacific Islands are also classed as Mongoloids, although they often have Caucasian features and some have bushy hair, like Negroids. Lastly, the American Indians are rated as Mongoloids, in spite of their straight eyes and copper colored skins.

We have said that there are a few races which simply do not fit into any of the three great stocks. The most interesting of these is the native Australian. (The white population of Australia immigrated to the island within the last hundred and fifty years and is mainly of British origin.) Man reached Australia very early, before most of the differentiation into races had taken place, and for some reason does not seem to have evolved much after he got there. These Australian aborigines are still very much like our first ancestors. They have brown skins, wavy hair, and long heads with heavy brow ridges and short wide noses. They not only look a great deal like our early ancestors, but also act more like them than any other living people. They are still a nomadic hunting

and seed-gathering people who know nothing of agriculture or metalworking. This is partly because they have been cut off geographically from the rest of the world since ancient times, so that they never had a chance to learn from neighbors or benefit by new discoveries; but it also seems to be partly because they never took any interest in the things which we think of as progress and better living conditions. Their chief interest seems to have been in keeping up an elaborate system of relationships and a complicated religion of totems and taboos. Any native Australian can tell you how he is related to every person in his tribe, but it never occurred to any of them to invent a machine.

The accomplishments of any people are always along the lines of the things in which they are interested. The Chinese were the first to invent gunpowder, but they used it for making firecrackers, not for killing people. The Europeans, who were more interested in conquest and expansion, saw a more important use for gunpowder, invented a gun to put it in and, because they were the first to have firearms, were able to establish dominance over most of the world in the eighteenth and nineteenth centuries.

It was not until the Europeans rose to world domination that they became race conscious. Before their distant voyages and conquests brought them into contact with people whose appearances differed markedly from their own, Europeans had known little of other races, and the few travelers from Africa or Asia who reached the European outposts were regarded as curious, but not inferior, strangers. However, when white explorers set forth with ships and guns and were able to conquer peoples of other races, they immediately reduced their victims to a position of social inferiority. Physical characteristics thus became a prompt and easy guide to the social status of the individual. The Indian in Mexico or the Negro in Africa could learn in a single generation to speak

the language of the conquerors, wear their dress, and behave like them in all ways, but he could not change the color of his skin nor the texture of his hair, which announced to all the world that he was not a white man and therefore was socially inferior. These characteristics, therefore, became the tests by which the rulers, always jealous of their prerogatives, determined membership in their own group.

When white men enslaved the conquered people of Africa and transported them to the New World as labor, these physical differences became even more significant. They made it possible to tell at a glance whether any individual was a free man or a chattel. At the foundation of our own American color line, seldom expressed but nonetheless persistent, lies the idea that every man with a black skin and kinky hair is probably the descendant of a slave. Although we conquered the Indians and drove them from their lands and have penned them up on reservations, we have never entertained for them the same prejudices that we feel toward the Negroes, though the Indians are as racially distinct from us as the Negroes are. People will boast of having Indian blood, and say that their ancestors were on the reception committee when the *Mayflower* arrived, but Negro blood is considered a taint. This makes no sense; it probably stems from the fact that the Negroes were conquered and enslaved, while the Indians, though driven from their lands, never submitted to white domination or were willing to work for their conquerors.

If it had not been for the accidents which made certain physical differences an easy test of social position, it is unlikely that the whites of today would be any more conscious of these differences than their ancestors of four hundred years ago were. However, we must face the fact that they are keenly conscious of these physical differences, and in an attempt to find justification for their prejudices they have turned to science.

The first white conquerors felt no need for such justification. Since they were Christians and the people whom they conquered were not, they felt that it was natural that the Christian God should allow them to subjugate the heathen. It was only when this simple faith was no longer enough that the white man called science to his aid, asking it to provide rationalizations for his supremacy. In doing so he sought partly to quiet his conscience, partly to be reassured that the dark-skinned peoples would not some day turn the tables on him. All history shows that that which has been won by the sword can also be lost by the sword and the white man is becoming increasingly uneasy. The meteoric rise of such a power as Japan shows that his uneasiness is amply justified.

White men have made three claims in their desire to establish their presumed superiority over other races. They say, first, that they are higher in the scale of evolution. But we have already shown that all races are disharmonic in their evolution, that each has retained certain primitive characteristics, while evolving away from the primitive in other respects.

The white man also claims to be a better man from a physical standpoint. Actually, physical fitness is always relative to the environment in which the individual, or the race, has to live and work. The white can boast no physical superiority in a country such as West Africa, where European governments have to give their officials six months' leave in every two years for reasons of health; and, even so, the death rate for whites there is several times higher than it is in Europe. The native Negro population, which rises to as many as two hundred people to the square mile in some places, can work and breed where the white man collapses, even though the Negroes have poorer living conditions and practically no medical aid.

The Nordics are prone to boast about their size, but stature is

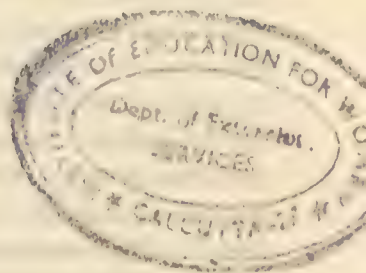
not a guide to physical fitness. The small Oriental often has more endurance and is able to work harder on less food than the big Nordic. Stature is largely a matter of food supply. Americans are getting bigger with each generation. Most adult children are taller than their parents, and the average height for men in the Second World War was considerably above that of those in the First World War. This is because we're a prosperous country and most American mothers are able to get lots of milk and eggs and spinach into their children.

The claim that the whites are more intelligent than other races is the one most often put forward, but it is also the most difficult either to prove or disprove. Our present intelligence tests cannot distinguish between abilities which are innate and those which are a result of training. They can show the relative intelligence of a group of people who have much the same cultural background, say professors' children in the eighth grade of the university school, but every test has to take for granted as its starting point a certain background of knowledge and skill. Any person who lacks this background is immediately at a disadvantage. There was a case in which the department of psychology in an American university was called on to devise a series of tests for school children. One member protested that the tests they had worked out were weighted in favor of the city child. Using his own farm background, he worked out a series of tests for farm children and then administered these to his colleagues. In this test one eminent psychologist showed a mental age of ten years. He could not even describe a disc harrow or tell which end of a cow got up first.

When we try to apply any of the present intelligence tests to people with totally different backgrounds, which means to almost any of the non-European groups, they are handicapped at the start. Even the pencil and paper which they have to use in copy-

ing a simple design are new to them and they are as slow and awkward as a child learning to use these tools for the first time. But imagine what your own score would be if you were competing in an intelligence test with Chinese students and had to copy a simple row of Chinese characters with a Chinese brush instead of a pen, while a Chinese psychologist held a stop watch on you.

Even with handicaps of this sort, most of the nonwhite groups which have been formally tested have shown up so well that it seems that the differences between them and the whites are no greater than the differences between different individuals within the white group. Everything that we know at present indicates that the importance of race does not lie in the matter of racial differences but in the social discrimination and prejudices for which race has become a symbol. Most races seem to be perfectly able to take over the techniques of modern civilization when they have the opportunity to do so. At the present time the so-called primitive people are becoming as impatient with the white man's condescension as they are with his exploitation and are getting ideas of how both can be removed.





Chapter 3

THE BEGINNINGS OF CULTURE

The last chapter covered a lot of ground, a quarter of a million years or so, from the misty beginnings of man up to speculations about his future. Now we had better go back to the beginning again and follow man's upward climb from a different angle than that of race.

The ancient Greeks thought that history was cyclical, that is, that the same sort of things happened over and over again, just as the same point on a wheel comes around at every turn. Later philosophers have tried to prove that it is more like a spiral and that, although events seem to repeat themselves, there has been a steady upward trend as man has acquired more knowledge and more control over his environment. The anthropologist also believes that there has been progress, but his records show man going forward in sudden spurts and then sitting back to catch his breath and get adjusted to the changes which his accomplishments have brought about before he makes another dash.

When any new element is brought into a culture, say a new idea or invention or different way of doing something, people have to alter some of their old ways in order to adjust to the new method. Also, the new thing opens up a whole series of possibilities for further advances. Think of the changes made possible by such an invention as the steam engine. When the new element is a really important one, something that deeply affects the lives of the people, the old patterns for living are broken up and all sorts of changes are made within a short space of time. After this, when the various parts of the culture have become adjusted to each other again, life settles down and jogs along for a while with little change.

The anthropologist calls these sudden forward thrusts "culture mutations." Of course there are many new things which do not influence people's daily lives enough to touch off any long series of changes. A new game or a new rhyme scheme in poetry can become part of a culture with very little change in a people's habits. The most important new things seem to be those which have a direct bearing on the way people work and satisfy their fundamental needs. In the whole of human history there have been only three fundamental changes in the way in which people could make a living and each of these changes has been followed by a remaking of the rest of culture.

The first of these basic mutations came when our remote sub-human ancestors learned how to use tools and fire, thus gaining a control of their environment which no living things had had before. The second came when men learned how to raise crops, instead of just gathering the wild plants that were at hand, and how to domesticate animals, instead of simply hunting them. Many changes and improvements followed the introduction of food raising, but for the most part the common people, the peasants who made up the bulk of population everywhere, went on

fluffy and delicious, he greatly enlarged his menu and his better food supply had far-reaching results. Bread is man's staff of life but there can be no bread without fire.

It is a scientific fact that population increase is dependent upon food supply; a family can raise only as many children as it can feed. When the food runs short, the weaker ones and the littler ones die. When man had to live on whatever he could catch or pick and eat raw, he couldn't keep a big family; but when he had a root cellar and a grain bin, starvation was not a menace and more children lived to grow up and have more children of their own, and the family of man spread over more and more of the earth's surface.

Tools not only increased the food supply by making it possible for man to dig more roots and hunt bigger game, but also helped him to protect himself against animals and to make himself more comfortable. Like the use of fire, the beginnings of tool using go back to the time before our ancestors had become fully human. Even the earliest subhuman men knew how to use a short heavy stick as a club and a long pointed one as a spear and how to crack stones and use the sharp-edged pieces for cutting and scraping.

The first stone tools were simply sharp-edged chips. Later men learned how to shape larger and heavier tools by knocking off flakes from a large piece of flint until they had given it the form they wanted. Such shaping can be done very rapidly if you know how, but it takes a great deal of skill and practice to do it well. Still later, men learned two other techniques of stoneworking, both of which were still used by the American Indians when the whites arrived.

When the Indian wanted to make a stone ax, he took a piece of tough stone, such as granite, and simply battered it into shape with another stone, breaking up a little of the surface at each blow. This does not take much skill. Anyone can make a passable

ax of this sort if he has the patience. However, it takes a good deal of time and is very hard work. To make an ordinary stone ax took an Indian about eight hours and he could not work at it very long at a time since the jolting from the blows soon made his arms and wrists sore. If he wanted to have a fine ax, he ground it smooth after he had shaped it by rubbing it on some sort of coarse stone. This took several hours more. The earliest men were on the move most of the time and found it inconvenient to have to carry an unfinished tool of this sort about with them. This sort of stoneworking did not become common until people had learned how to plant crops and settle down in one place for months at a time. Then the workman could keep his unfinished ax in his hut and get it out to work on when he felt like it.

The other technique of stoneworking was that which the Indians used for making their knives and arrowheads. (Most of the big points of chipped stone were really knives and not spearheads.) To make an arrowhead, the Indian took a large piece of flint and knocked off flakes, the longer and thinner the better. He then selected a flake of about the size and shape of the point he wanted to make and finished it off by pressing off little chips of stone with a small chisel-shaped piece of bone. Nowadays you can do the same thing with a big nail ground to a chisel edge. This sort of work takes a great deal of skill and muscular control, but it goes very fast. When the American army was fighting the Apaches, they wanted to find out how long it took the Indians to make arrows and asked a friendly Apache to chip an arrow while they timed him. It was found that an Indian could make a serviceable arrowhead in forty-five seconds and one as good as most of those you see in collections in a minute and a half. The reason we find so many Indian arrowheads today is because they could be made so easily and quickly that they were allowed to lie where they fell. The earliest men did not use this pressure flaking tech-

nique, but it was invented at least twenty thousand years ago, long before men learned how to plant crops.

In spite of knowing how to use fire and how to make simple tools, early man had a hard time to keep alive. He had no possessions that he could not carry with him. He picked the fruits and dug the roots and gathered the seeds that nature provided but he never planted anything. He killed the animals that roamed wild and free as himself, but he never thought of trying to domesticate these hostile creatures and make them part of his household. Because he was foot loose and always looking for new country where game was more plentiful and the fruits had not been picked over, he was constantly on the move. His continuous using up of nature's bounty without ever replacing anything would have scandalized a conservation commission, if there had been any such thing, but it was probably a fortunate state of affairs for the world of that time, for man's continual using up of land and moving on to fresh fields was the urge which populated the world.

We haven't any first-hand evidence of how early man lived, but there are still bands of people in remote parts of the world who are simple hunters and food gatherers and whose life cannot be very different from that of our ancestors of thirty thousand years ago. The first men almost certainly lived together in a small band of about thirty or forty persons, as this is the largest number that can be supported by working out from a single camping place. Each band probably had a leader, the ablest man in it, who lost his leadership as soon as a better man appeared. There certainly was no law and no machinery of government, but in such small close-knit groups these were not needed.

If we can judge from modern savages, early man had his own set of customs, however, and people who broke these rules or interfered with the rights of others were dealt with. The only punishment necessary to keep people in line in these primitive bands

is usually simple ridicule. The bands are small and everyone knows all about everyone else. The man who has cheated or injured his neighbor can't move on to another community; there is no place for him to go. Usually the neighboring bands are hostile and a man has to stay with his own people for protection. He must stay and accept the ridicule and unpopularity, which are harder to bear than any sort of formal punishment.

The Eskimos, who still live under very much these same arrangements, say that if a man steals something, people will not do anything about it, but they will laugh when his name is mentioned. This does not sound like a very terrible punishment, but theft is practically unknown among the Eskimos, while in our society even jail sentences and fines do not effectively prevent stealing. Of course, in extreme cases, primitive men will resort to revenge killing for some deep-seated wrong, such as wife-stealing, but the times when the gentler method of ridicule would not work have been few and far between.

There was undoubtedly family life within the band life, and families then were not so different from our own: a man and a woman and their children making a close inner group and a home, be it ever so humble—and it certainly was. It was once believed that the first men lived in a state of careless promiscuity, taking up with first one woman and then another, and establishing no homes of any sort. However, this seems highly unlikely since there are no groups of people living today, no matter how remote and primitive, who do not have some sort of permanent family organization and even most of the apes and monkeys choose their mates and stick to them for life. Family ties and a home base are innate needs of men everywhere and at all times.

To us moderns, who naturally expect that foodstuffs are grown on farms, the raising of crops is such an obvious idea that it seems incredible that it took man thousands of years to think of it. But

raising crops is a laborious business with planting and weeding and hoeing and harvesting, and so long as nature provided plenty of food just for the picking, man had no incentive to settle down and till the soil. However, as the population grew and wild foods, having been picked each year without ever being tended or replenished, began to get scarcer, agriculture was the only answer to the dwindling food supply. It probably started with the cultivation of wild patches. Some family had probably spotted a place where the berries grew thick and luxuriant and they tried to keep it all for themselves and went back to pick it each year. They also discovered that if they cleared out the underbrush around the berry bushes and turned up the soil, the berries grew bigger and sweeter. The Paiute Indians of our Southwest still irrigate wild plants but never bother to plan or cultivate gardens.

The women were probably the first farmers. They had time to fuss around with weeding and watering their special patches while the men were off hunting. The idea of planting a garden was probably an accidental discovery, brought about when the prehistoric housewife noticed that the peelings from wild yams which had been dumped on a bare patch of earth had taken root and grown into a fine crop of new yam plants, or that new wheat sprang up where grain had been spilled. Raising the vegetable food continued to be the woman's job, while providing the meat has always been the special province of the man. Even today in most primitive communities the women do most of the agriculture, and on our own farms the woman helps with the weeding and hoeing and keeps her own kitchen garden, but the man does the herding and milking and butchering.

Although it took people a long time to get the idea of farming, they began raising crops independently in several different regions. One of these independent centers of agriculture was in the humid, tropical climate of far southeastern Asia. The heavy jun-

gle here left no room for seed grasses to grow and the wild vegetable foods were mostly roots and fruits.

Bananas and breadfruit and taro and yams were first domesticated here. Bananas and breadfruit grow on trees and, while at one time they probably had seeds which they dropped in order to propagate themselves, they have been tended by man for so long and bred for firm, seedless fruit that they have lost their seeds and can only be replanted by humans. Yams are like sweet potatoes and taro is a large, bulbous root which is still a staple of diet in the South Pacific Islands.

Southeastern Asia is a warm wet region where fruits and roots flourish, but southwestern Asia is drier and the people there had lived primarily on the seeds of various grasses. It was there that the method of raising grain, which is the basis of most of our own type of agriculture, began. The remains of flint-edged sickles, used for reaping grasses, have been found in caves in Palestine dating back nine thousand years. Wheat, barley, rye, and oats are the crops which were developed from the wild grasses of that region. This type of agriculture spread down into India, which has a hot, wet climate not good for grasses, but there was a grain there which would grow in swampy ground, rice, which became the mainstay of the diet of many peoples.

In the New World, the Americas, agriculture was beginning also, independently. Maize or corn was the chief crop of the prehistoric Indians. There was no corn in Europe or Asia until the early explorers brought seed corn back from their voyages. It is such a rich and useful food that it spread rapidly and is now the staff of life to many people who find it hard to believe that their ancestors were ever without it. The native tribes on the island of Madagascar have a legend that God had to create men and corn at the same time, since man can't live without corn. They scornfully reject the fact that corn was brought in from another part

of the world only a few hundred years ago. Beans, squashes, pumpkins, and peppers are also plants which were first domesticated by the American Indians.

South America made some use of corn but specialized in two root crops: the potato and manioc. We call white potatoes Irish potatoes, and there is a general belief that they originated in Ireland, but in reality they were first brought back by the Spanish explorers who ate them at Inca feasts and thought that this was a vegetable worth carrying back across the sea to the home folks. Ireland's first potato crop was raised in 1588 on Sir Walter Raleigh's estate in Cork, from seed potatoes brought from Peru.

Along with the raising of crops went the domestication of animals. No one knows for sure which came first; it's like the chicken and the egg. People couldn't plant and harvest crops while they were continually on the move in pursuit of wild game; on the other hand, they couldn't tend and feed barnyard animals until they had a stable food supply for themselves and the beasts. For the first few hundred thousand years of his existence man pursued his meat supply on foot with his knife or spear in his hand. His hunting kept himself and his family continually wandering, so that they could have no possessions, no settled villages; then he conceived the idea of taming the animals and having them come to live with him, so he could get them when he wanted them, and it changed his whole way of life.

The first animal with which man established friendly relations was the dog. The dog is not only man's best friend, but also his oldest one. Men and dogs joined up before there was any settled agriculture or any attempt to domesticate animals for food, and because of this long history of mutual esteem, men have never regarded the dog as anything but a companion and a pet. There are a few places where people eat dogs, but most of the world considers it a pretty low thing to do.

Men and dogs probably got together in ancient times for their mutual benefit. The first dogs hung around the camps of the first men and went along on hunting trips for the sake of the meat scraps they could pick up. The men were glad to have the dogs along because, with their keen sense of smell and hearing, they could detect the nearness of game or the approach of enemies before the men could. However, the dogs probably stayed wild and weren't made members of the family at this stage.

We can get a pretty good idea of how early man treated his dogs by watching the modern Australians, who live in much the same way that primitive man did. The Australians probably brought the dog with them from Asia when they made their first migration, and dogs are still the only domestic animal that these people have; they've never used the kangaroo or the wallaby (the only large animals native to Australia) for anything but stew. The Australian dogs help their masters in tracking and driving game, but when they feel the urge to take a mate, they run away to the bush and go wild. Occasionally there is a devoted dog which stays with his master for life. Such animals are well fed and highly valued, but the Australians think this is something very special and make no attempt to breed dogs for this quality or to train them for it. They have no strain of domestic dogs distinct from the wild ones. They keep up the supply of hunting dogs by catching and training wild puppies.

The taming of animals of all kinds probably began with man's fondness for pets, which seems to be common to all people of all countries. Young animals are cute and amusing to have around and to play with, and any hunter who finds an animal's den may kill the mother for food, but he'll bring the young ones home for his own children to play with. The children, and usually the grownups too, quickly become attached to such toys and keep



THE ABORIGINAL HUNTER BRINGS HOME A PET FOR HIS CHILDREN

The domestication of animals began with the bringing home of young animals which were kept as pets. The hardy ones and those of species which could get used to living with man survived and became the ancestors of man's later flocks and herds.

their pets as long as possible, unless there is an acute food shortage or the animals grow up to be dangerous.

The North American Indians, who had no real domestic animals except the dog, went in largely for pets. They brought up fawns and buffalo calves and especially bear cubs, not to mention small animals like prairie dogs and chipmunks. One old Comanche Indian told us that when he was about eight years old his father came back from a hunt with a bear cub, which he introduced to the boy as his bear brother. For the next three years the boy and the bear played together, ate from the same dish and slept in the same bed. But at the end of that time the bear was full grown and began to get troublesome, especially at meal-times. The bear always insisted on being served first and took more than his share, and if he was crossed in his desires, he'd knock over the pot that held the family stew with one clout of his great paw and lumber off in a temper. The bear hated the packing and moving from one camp to another. The dogs were trained to drag loads on the travois, but the bear was nothing but a nuisance on such occasions. He once held the family up for two hours after they were all packed and ready to go by climbing up a tree and refusing to come down. After this, the boy was sent off to visit some relatives and when he came back his bear brother had disappeared. His parents explained that the bear had gone back to his own tribe.

Another old Comanche, lonely after the death of his wife, adopted three bear cubs and brought them up in his lodge with him. He was evidently a good disciplinarian because his bears were very well behaved, even after they were full grown, and went about with him everywhere, even to feasts, where they were served like the rest of the guests.

Animals were first tamed as pets, not for their usefulness, but it was only when men began to employ animals for a practical

purpose that they tamed them in large numbers and began to control their breeding so as to bring out the qualities which were most desirable. At one time or another men have domesticated more species than we have now. Thus in ancient Egypt there were domestic gazelles, antelope, and hyenas. However, gazelles and antelope proved less useful than cattle, and dogs make better hunters and pets than hyenas, so the domestic strains of these other animals were allowed to lapse.

Not all animals are capable of adapting themselves to captivity and life among men. Though they may be docile enough while young, their wild nature asserts itself when they grow up. Wild rabbits will wear themselves out trying to break through their pen, even though they lived there amiably and contentedly when they were little. A leopard cub makes a charming pet, but when it grows up it may become dangerous and attack its master without warning.

The pig and the chicken were domesticated in southeast Asia but they were raised first for religious uses. Chickens were used for divination and for sacrifice to the gods and there was a widespread belief, as among our own ancestors, that the crowing of cocks scared away ghosts. Pigs were also used for sacrifice and for foretelling the future. To this day the Dyaks of Borneo kill a pig and take out its liver, from which the medicine men can tell what is going to happen. When it was necessary to know the future, it was much simpler to have a tame pig in the barnyard than to have to go out and hunt a wild one, and the same thing was true for chickens. Even the tame buffalo are used only for sacrifices by some of the wilder tribes of the southeastern Asiatic mountains, and it seems probable that the main stimulus to domestication here was religious also.

In the southwestern Asiatic region domestication seems to have been more practical. Sheep, goats, donkeys, camels, and,

most important of all, cattle were first raised and herded in this area. Sheep were developed from two wild species which had hair and not wool and at first were used only for meat. However, wool was being woven into cloth in Mesopotamia by 3000 B.C. The donkey was developed from the wild ass and was used always for carrying loads or drawing carts. The camel seems to have been least changed from the original wild species, which was already excellently adapted to desert life. When man succeeded in making friends with the camel, travel across the deserts became possible and camels were an important factor in the development of long-distance trade.

Present-day cattle derived from two wild species, one of which was developed into the various breeds with which we are familiar, the other into the humped cattle of India. With the domestication of cattle came one of the most revolutionary of economic inventions, milking. This changed the cattle herds from mere meat reserves, to be drawn on in case of need, to regular sources of food. It became possible for people to live on their herds without having to kill the animals. Milk and cereals together provide a balanced ration in which there are all the necessary elements for healthy life and growth. Even a hundred years ago the Scottish Highlander lived almost entirely on milk and oatmeal, worked hard and lived long.

There is another animal which was most important in man's road toward civilization, the horse. We know that horse herds roamed over Europe after the Ice Age and were hunted for food, forming an important part of man's diet. The discovery of some prehistoric carvings which seem to show horses with bridles suggests that even in those days men were beginning to tame the horse, although there are no signs that they rode it. However, when the climate of Europe grew warmer and the forests sprang up, the horses, which had to have open country to run in, moved

eastward to the Asiatic steppes and it was there that they were first really domesticated as riding animals.

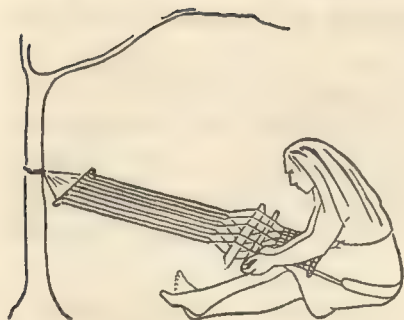
The horse was the first domestic animal adapted for use in war. The Indians have war elephants but the elephant has never really been domesticated, only tamed. The domestication of the horse made it possible for the people of the plains to raid their settled and more civilized neighbors, striking without warning and escaping before men on foot could assemble and attack. Even if they did have time to assemble, the mounted men could break up their formations by the sheer weight of charging man and horse, or ride around them and shoot them from a safe distance. The mounted, armored fighting man held his supremacy, whether he was European knight or Mongol raider, until the development of the repeating rifle.

One last animal should be mentioned for the Old World—the reindeer. Its domestication came late, by tribes who already had had experience with horses and cattle but who had been driving north into cold countries where these animals could not thrive. To this day the reindeer tribes who once had horses, ride their deer, while those who once had cattle, drive them.

The North American Indians of the New World had plenty of pets but no useful animals except the dog, probably because there weren't any species on our continent that could be domesticated successfully. Even the whites have never had any luck trying to make work or herd animals out of the buffalo or the elk. The Mexicans domesticated the turkey and the Maya villages had small herds of tame deer, but neither of these had much economic importance. In Peru, the Indians domesticated the llama, the vicuna, and the alpaca, and used them for meat and wool and transport, but never got around to milking them. The Peruvians also domesticated the guinea pig, that little animal

which later proved to be so useful in the laboratories of modern science.

The first great mutation, the use of tools and fire, made men human and gave them control of their environment; the second, the planting of crops and the domestication of animals, enabled men to settle down and to begin social living. This mutation began in the dawn of history, long before written records, but it continued until the machine and the discovery of how to acquire power from heat brought about the third great mutation, to which we are still attempting to adjust. Many things happened in the intervening centuries: culture was enriched; cities were built; conquerors established great empires and lost them again; there were wars and crusades and explorations; but the mass of the people, those who keep the country going but never get into the history books, went on patiently tilling their fields and herding their flocks as they had always done, until the third mutation came to change the economy of all the world.



Chapter 4

BASIC INVENTIONS

Man's progress in the world has not been a steady upward march but has come in a series of sudden forward spurts, each followed by a period of gradual adjustment to the improvements which have been introduced into his life. Throughout history man has run forward a little way and then slowed down to catch his breath. The sudden bursts of progress are always brought about by some new discoveries or inventions, new elements which enter the culture and change and enrich the way of life. The two things which enabled man to change from a simple wandering nomad to a settled family man were agriculture and the domestication of animals; but the things which paved the way for man as a city builder and artisan, were four great basic inventions: the plow, the loom, the wheel, and metalworking.

A discovery is usually something which has been stumbled upon accidentally; an invention something which someone has conceived in his head and brought to reality by experiment. A

discovery is an addition to knowledge; an invention a new utilization of something already known. The scientist who discovers a new element in physics may be acclaimed by his fellow scientists, but his success means nothing to the public and the new element remains a mere laboratory curiosity unless some use can be invented for it. Aluminum was once an element of this sort. Its discovery went unnoticed except by a few scientists until the inventors found uses for it and new ways of extracting it.

To go back to older and simpler discoveries, many uncivilized groups must have found out that coal would burn. If they lived in a region where there was coal on the surface, this fact would have been evident the first time that they built a campfire against a coal outcrop or tried to use chunks of it to prop a pot in the fire. However, few primitive people ever dug coal to use as a fuel. The knowledge that coal would burn was a discovery; the method of mining it and using it was an invention.

Inventions fall into two categories: basic inventions and improving inventions. A basic invention is one that makes use of a new principle and opens the way for a series of new advances. An improving invention is one that makes some existing idea or appliance more efficient and useful. The telephone was a basic invention; the hand phone with its dial system, an improving invention. Basic inventions are, of course, much rarer than improving ones; in fact, many generations may pass without a single basic invention being made.

Every invention requires two things: an inventor and a store of knowledge from which he can select the knowledge to be combined and utilized in new ways. The reason why early man advanced so slowly was that his store of knowledge was so small; it had to be gathered crumb by crumb. A modern inventor has a great body of information to start with and access to laboratories and efficient methods of experimenting. He has only to combine

and improve things which already exist in order to produce something new. With these resources the frequency of inventions has increased enormously. In fact, they are pouring in now faster than the public can absorb or adapt to them.

Every invention that has ever been made was the brain child of some individual or at most of a very small group of individuals who pooled their intelligence to solve a particular problem. Society takes over inventions and uses them, but society, as such, never invents anything. Every invention must originate in someone's mind. Of course two or more men who have the same store of knowledge may hit upon the same idea quite independently. Thus in our own culture there were a number of people who recognized the possibility of wireless communication and worked on the problem, each for himself. Marconi was the first really to solve it, so he gets the credit. Starting with Marconi's invention, a great many other people have worked to bring the radio to its present state of efficiency, but the average individual in our society didn't worry about wireless communication until he could buy a radio and hear a program over it.

What makes some people puzzle and work to invent new things while others go along quite contentedly with what they have is a problem which is still unsolved. Most modern inventors hope that they will make money out of their inventions, but before the days of patent laws there was little profit in inventing. The economic advantage which came from having a new and better way for doing something did not last long when everyone else was free to copy the process. There is an old saying that necessity is the mother of invention, but this is hardly borne out by the facts. Necessity may stimulate improving inventions of a minor sort, but most basic inventions, and even the bulk of improving ones, seem to have been made during periods of ease and economic surplus when men had leisure to ponder and ex-

periment. People rarely invent when they have to spend all their waking hours grubbing for a bare living. Man is more apt to produce something new because he is restless and a bit bored than because he is overworked and hungry.

Neither are most inventions a response to any desire or conscious need of the inventor's society. Of course, times of war with the competitive urgency for new and secret weapons and for synthetics to replace goods which have become unobtainable, do act as a spur to invention but in peacetime there is no pressure put upon the inventor. No one missed the radio or automobiles before they were invented. In fact, society is apt to resent improvements at first and doesn't want to be upset by changes in its familiar way of life. There was plenty of grumbling when the horseless carriage first made its appearance. The wagon and the railroad provided what seemed perfectly adequate means of transportation and most people thought that a mechanical contraption which was always getting stuck in mudholes or breaking down at inconvenient moments would never replace the reliable old horse.

Early motorists, to be sure, were often towed home ingloriously behind a grinning farmer and his team of horses while the onlookers jeered from the sidewalks. As time passed many improving inventions worked the "bugs" out of the new machine, and hard roads and filling stations, auto camps and roadhouses, began to spread over the American countryside. Many customs which had seemed a permanent part of American life proved to be soluble in gasoline. The automobile dried up the villages, as the farmers were able to drive to larger centers for their Saturday buying. It also brought an increase in crime, since criminals could now make a quick getaway across state lines where the county sheriff couldn't catch them without extradition papers. The changes have been too numerous and far reaching to discuss

here. Even after forty years we are still adjusting to motorized transportation on the ground and we already see the shadow of the helicopter poised ready to swoop upon the trusting public.

The automobile took so rapidly in the United States not only because it was invented and perfected largely in this country but also because Americans have always been interested in doing things by machinery. The Greeks in the third century before Christ invented a perfectly good steam engine and installed one of them in the lighthouse in the harbor of Alexandria, using it to haul up fuel for the beacon. However, the Greeks were more interested in art and philosophy than they were in mechanical gadgets and they had an ample supply of slave labor to do the hard work for them. They regarded the device as just a toy and a curiosity and no one tried to improve the engine or to put it to other uses. Nineteen centuries later, James Watt reinvented the steam engine and this time it proved to be one of the most important inventions in human history, bringing in its train a thorough reorganization of human life, because by this time people were interested in doing things by machinery and the new invention was eagerly adopted and put to many uses.

A successful invention must be one that not only works and does what it is intended to do, but also one that the members of the inventor's society will accept, improve, and make a regular part of their culture. Such successful inventions are much rarer than working inventions and history is full of examples like that of the Greek steam engine: good ideas that did not take.

After this side excursion, let us get back to where we left early man with his four basic inventions, the plow, the loom, the wheel, and metalworking. All four of these inventions seem to have been made first in southwestern Asia, in the region now covered by Iran and Turkey. From there they spread over most of the Old World and lay at the very foundation of all the Old

World civilizations. The American Indians seem to have re-invented the loom and metalworking for themselves and became very skillful with both in the region from Mexico southward. In the last two or three years archeological discoveries have shown that the Indians of the east coast of Mexico had also invented the wheel before the white men came, but they used it only in making little toys for children to pull along by a string. Apparently they never realized what could be done with it, any more than the Greeks appreciated the possibilities of the steam engine.

The invention of the plow changed the whole concept of agriculture. We are not sure of the exact origin of this tool since it was in use before the dawn of history, but it seems fairly certain that it was developed out of some sort of digging stick. Presumably the first step in its development came when a rope was fastened to the handle of the digging stick a short way above its point so that one man could pull it through the ground while another man guided it. It would be a short step from this to the true plow with its share set more or less at right angles to the beam. It required only a little more ingenuity to fasten an ox from the domestic herd to the beam of the plow and have him instead of a man pull it. After this you had the farmer with his beast pulling the plow: the mainstay of the food-raising world from those ancient times to the present. Many improving inventions have been made on the plow through the ages. Our own Thomas Jefferson invented the moldboard, to turn over the earth in the furrow, and Americans were the first to make plows all of steel, but the essential pattern has not changed in six thousand years.

The results of the invention of the plow were far-reaching. It made it possible for a man to cultivate much more land than he could ever have worked with his digging stick. Compare the time

and labor involved in plowing a ten-acre field with that required to spade it. The plow turned over the soil more thoroughly, thus insuring better crops. Lastly, with the introduction of the plow, agriculture became an important male industry, instead of just a tending of garden patches by the women. As soon as animals were used in farming, it became a man's job, partly because the handling of the plow required more strength and partly because there was the old carry-over from the days when hunting and herding were the man's job and gathering food was the woman's work. As soon as oxen were used to draw the plow, plowing became a man's business and women were limited to minor tasks such as weeding and tying the sheaves at harvest time.

The second basic invention was the loom. This was doubtless developed from a simple weaving frame of the sort which kindergarten children use to weave mats, and which some uncivilized people still use for weaving cloth. The first frames simply served to keep the warp threads taut and prevent them from tangling. The true loom came with the addition of heddles to lift a whole series of threads at once and thus speed up the work of putting in the weft. The loom gave the women something to do in the time that was free to them after men took over the heavy work of agriculture. To this day there are many peasant villages where a loom is set up in every house and the wife works at weaving in the intervals between cooking and baby tending. The loom made it possible for people to have more and better clothing, and since a skilled weaver could make more cloth than was needed to clothe her own family, it provided a commodity which could be used in exchange for other things which the family lacked. The fruit of the loom was thus the start of home industry and trade goods.

The third and in some ways the most important of these basic inventions was the wheel. This developed out of the roller used as

an aid in moving heavy objects. A big stone or a fallen tree that was too heavy to carry could be shoved along if something which rolled were placed under it. Then someone conceived the idea of making rollers which were thinned down in the center so that a box of some sort could be fastened to them with strips of leather. This was the first cart. Wheel and axle were cut in a single piece, the wheels being solid wooden disks, and the whole thing turned against the bottom of the cart body, probably with much creaking and grinding—and much heaving and straining by the men who were trying to pull the load. Then one day some ingenious fellow thought up a way to make the wheel turn on its own axle and the smooth-rolling, wheeled cart was born. We know that something much like the modern cart was in use in Mesopotamia by 2500 B.C.

Wheels were certainly first invented as a means of getting goods from one place to another, but their prime importance lay in the new mechanical possibilities which they opened up. Two of the earliest applications of this new invention were the potter's wheel and the lathe. Fantastic as it may seem, it appears that the original linkage of the wheel with the domestic animals that pulled the carts placed the wheel and everything connected with it on the male side of the division of labor. In most parts of the world the making of pottery, so long as it is modeled and shaped by hand, is a woman's industry, but as soon as these same people start making pottery with the potter's wheel, it becomes a man's job. And when, much later, the wheel became the basis for all sorts of machines, the running of machinery was also assigned to men. It was not until wartime manpower shortages forced women to go to work in factories that women in any numbers took over the operation of our great wheel-driven machines.

The plow, the loom, and the wheel were developed in the food-raising lands of southwestern Asia but they spread rapidly

over the rest of the world which man occupied. The herding nomads, those who rejected the settled life and clung to the old simple roving patterns, probably did much to spread these new ideas as they traveled from one region to another. In most of Europe the first food raisers were certainly immigrants from the east—who brought the plow, wheel, and loom with them. They settled in fortified villages and pushed the aboriginal food-gathering tribes back, very much as our own American pioneers pushed the Indians out of their own lands when the newcomers established villages on these shores. The food-raising tribes also fought among themselves and pushed each other around in their search for new lands. If you have studied Latin you will remember that Caesar's first campaign in Gaul was against the Helvetii, who had found their territory unable to supply their needs and had started out in search of new land.

But while the patterns of a settled food-raising society were spreading over the Old World from the center in southwestern Asia, another basic invention was developed in this same region: **metalworking.**

Copper, silver, gold, and iron (the last only in the form of meteors which have fallen from the sky) are the only metals which occur free in nature. All others have to be extracted from their ores. Thus these four metals were the first ones ever to be used, and many primitive people learned very early in their history how to shape these metals into implements by pounding and grinding. The Indians of Wisconsin made arrowheads and knives and ornaments from copper nuggets which they found in the glacial drift, and even mined some copper in prehistoric times. However, the supplies of free metals were too limited for them to play a very large part in any economy. The real beginning of metalworking came when it was discovered that metals could be smelted from their ores, making large supplies available.

Apparently the first metal to be reduced in this way was copper. Malachite, a green stone which we still use in jewelry, is a copper carbonate. Many of the early people in the Near East ground it up and used it for face paint. The first step in smelting may have come when some luckless individual dropped his bag of face paint into a big fire on a windy day. The ground up ore could be reduced to copper at a temperature of only twelve hundred degrees and, in raking through the ashes afterward, the owner might have found a blob of metal where his paint had been. Since metallic copper was already known and highly valued by these people, he may have tried to get more of it by the same process and in this way smelting was born.

Whatever the first steps were, the people of southwestern Asia had learned to smelt copper by 3500 B.C. at the latest, and their metalworking developed rapidly from then on. Most metallic ores can be recognized by their weight and texture and the early miners seem to have experimented with most of them. By 3000 B.C. they had learned how to make alloys, that is, mixtures of metals. The first alloys may have arisen from the smelting of mixed ores or from the perhaps not too honest attempt of some metal worker to adulterate the valuable ores by putting in a few cheaper ones. Whatever the motive, it led to the discovery of bronze, an alloy of tin and copper which is a metal vastly superior to either. It is tough and hard and can be cast in closed molds, something which it is very difficult to do with copper. From the time of its discovery until about 1000 B.C. bronze remained the chief material for tools and weapons in this region and its use spread over the whole of Europe and Asia. This period is often referred to as the Bronze Age. The South American Indians learned independently how to smelt metal and how to make alloys. The Incas discovered how to make bronze and the Chibcha in Colombia made an alloy of gold and copper called *tumbaga*, which they used mainly for ornaments.

Although iron was a known metal and meteoric iron was prized and used in the rare cases when it was found lying where it had fallen from the skies, iron did not become important until long after most of the other metals were in use. Since iron ores can easily be identified as ores by their texture and weight, the reason iron was not smelted was probably that no one was able to work out the special techniques which iron requires. Iron can be melted at only a very high temperature, in fact Europeans did not really learn how to melt and cast it until about the time of the discovery of America. The Chinese discovered how to do it two thousand years earlier and made cast-iron stoves, but this was because they had much better bellows than the European ones and so could get a hotter fire.

In the smelting of most ores the metal melts and collects at the bottom of the furnace, where it sets into an ingot. In smelting iron ores at ordinary temperatures, the slag melts and runs down while the iron stays above as a spongy, clinkerlike mass which is called the *bloom*. This bloom has to be taken while white hot and pounded into solid metal. Even after the early smiths had the iron, they could not work it in the same way as the familiar bronze and copper, which were cast approximately the required shape, then pounded to give them a hard edge or work them out into thin sheets. When they became hard and brittle from too much pounding, they could be softened and toughened again (that is, annealed) by heating them red hot and plunging them in water. But iron could not be cast and, the more one tried to anneal it by the familiar method, the harder and more brittle it became. It must have taken a long time to discover that the only way to soften it was by cooling it very slowly.

It seems probable that the early smiths experimented with iron ores, as they did with most others, but abandoned them as worthless. Just where people first discovered the numerous tricks

needed in iron working is still an open question, but it may have been in southern India. At least that was the place where the first steel was made by alloying iron with carbon.

Meteoric iron is easier to handle than iron ore and is tough enough so that it can be beaten out cold. Many different peoples, including the American Indians, valued it highly and used it when they could get it, but there was not enough of it for it to have any economic importance. The only place where meteoric iron has played a real part in the economy of a primitive people is in Greenland. Here the Eskimo used it even in prehistoric times, chipping pieces off the great star-chunks and cold-hammering them into knives and harpoon blades.

All anthropologists who had worked in the Arctic were familiar with these iron tools but no white man had been able to locate the meteors from which the iron came until Captain R. E. Peary explored Greenland in 1894. Peary and his companion Hugh J. Lee were led by two Eskimo guides, Tah-lah-to-ke-ahq and Kes-s'oo, to a remote place on Cape York. When they scraped the snow away from what appeared to be three great mounds, they found that these were indeed the meteors. Captain Peary had no apparatus at the time to move the meteors, but in 1895 he returned with the steamer *Kite* and carried off the two smaller ones, one of which, called the Woman, weighed five thousand pounds and the other, called the Dog, nine hundred pounds. The biggest one, which the Eskimo called Ahnighito, weighed thirty-seven tons, in spite of the centuries of chipping and hacking which it had sustained. It was so large that Peary could not handle it, but he was a persistent man and in 1897 he went again, with the steamer *Hope* and more powerful equipment, and carried it off too. These three meteors are still on view at the American Museum of Natural History in New York City.



Chapter 5

THE COMING OF THE CITIES

The word civilization is akin to the Latin *civitas*, meaning city, and no people can be regarded as civilized until they have developed the settled life, the cooperation, specialization, and trade which makes city living possible. As long as men lived by hunting and food gathering they could not stay long in one place or live together in any large numbers. Hundreds of hunters might assemble for special occasions, as our own Plains Indians used to do for their annual Sun Dance ceremonies, but each family had to bring its own rations, saved for months out of the scanty daily supply, and, as soon as the hoarded food ran out, the little bands had to scatter to their hunting grounds.

With the appearance of food raising, it became possible for much larger groups to live together and even to stay for several

The drawing above shows early Chinese writing. The Chinese began to write with picture symbols about 1500 B.C. The character at the top right means "servant" and shows a boy offering a bowl of rice. The one at the extreme right means "captive" and shows a man in jail. Modern Chinese characters were developed from such picture-words.

years in one place. However, the size of the group was always limited by the amount of food that could be raised on fields within walking distance of the village. Since the poor methods of agriculture exhausted the soil quickly, the whole village had to move every few years. It was only in the few favored places where the soil was so rich that it was practically inexhaustible that the villagers could stay in the same place generation after generation. The great difference between the village and the city was that the city did stay in the same place for centuries and that it lived by trading skills for food. It depended for its existence on specialization in knowledge and crafts and in turn encouraged more and more specialization.

The little groups in which hunters and food gatherers had to live most of the time could not support any professional crafts men. The only division of labor which they knew was the ancient one between men's work and women's work. Every man had to be able to take care of his own needs and to meet any emergency which might arise. Such a life makes for courage and self-reliance, but the man who has to be Jack-of-all-trades is usually master of none. The first villagers also did almost everything for themselves, although a family might raise a little more food or weave a little more cloth than it had to use. The surplus could be traded for a plowshare hammered out by the village smith or made by the village shoemaker.

The city dweller has to be a specialist. He cannot raise his own food since there is not room enough within the city walls or on the land which is within walking distance. In most cases he cannot even produce the raw materials needed for his crafts. At the same time, since he and his family must eat he has to produce something which he can exchange for food and raw materials. He must do some one thing so efficiently that he can produce more than he and his family can use and do it so well

that people will be willing to buy his produce in competition with that of other craftsmen. Since there are more people in the city, and especially in the surrounding rural regions which always depend upon a city, the demand for craft specialties is greater.

City dwellers learn to do work of more and more limited sorts better and better. In present-day industrial life the factory worker does his one small job and that job only day in and day out for years on end and often makes only a single piece of some greater whole so that he may never see the finished product on which he is working, doesn't know where his materials come from or where the goods he makes are destined to go. If he has any other occupation besides his daily job, it is just a hobby. He may still raise cabbages in his back yard or build furniture in his basement workshop but he does it for his own satisfaction. It seems that no matter how specialized they become, people still have the urge to grow things in their own soil and make things with their own hands.

Living together in large settled communities created many problems for the first city dwellers. Until very recent times cities have been dangerous and unhealthy places. Wandering hunters and food gatherers never had to worry about sanitation and garbage disposal. When the camp became too cluttered they simply moved on to a fresh, clean spot. Even villagers could get rid of their refuse by carrying it a little way or by leaving it to the pigs and vultures. Until very recent times cities have had no garbage disposal systems. Since it was too much trouble for each family to carry its filth and refuse beyond the city wall, they simply dumped it into the street. Even the sewers of Roman cities were built mainly to carry off rainwater and were flushed only when there had been a downpour. In the present city of New York housewives can be fined \$500 for shaking a dust mop out of the window, but in Colonial days many a dandy com-

ing home late along New York streets had his clothes ruined by slops tossed out of a second-story window by some careless chambermaid.

Even in our well-regulated and sanitary modern cities, people like Eskimos or Navajo Indians, who have always lived in the open, fall easy victims to tuberculosis, influenza, and other ills. It is not just that they are unused to restricted life and do not like it. Masses of people living together exchange bacteria and give rise to new and more virulent strains of disease. People died like flies in the ancient walled cities even when there was no pestilence. Skeletons from the graveyards of one of the oldest cities in the world show that the average age for the population at death was less than twenty-five years and there is no reason to suppose that this place was unusually unhealthy. Of course those who did survive were unusually tough, with a certain tolerance for the diseases that came from crowding, and they transmitted some of this toughness to their offspring. However, city living is still so new in human history that even today we have not been able to adapt to it as a species. Some races can do better than others because they have been exposed to city dwelling longer. The Chinese are able to live happily and fairly healthily under crowded and unsanitary conditions which would undermine the health of most Americans. This is due to the fact that our own North European ancestors did not begin to build cities of any size until a few hundred years ago, while the Chinese had cities of over a million as far back as the beginning of the Christian era.

In spite of this gradual adjustment of various races to city living there is still no race which has become perfectly adapted to it. Even peoples who can live fairly well in cities do not breed well in them. Cities have to depend on their neighboring rural areas for the people as well as the food and raw materials which

are needed to keep them going. This means that the problems of law and order are quite different in a city from those in a village. Village populations are small and a stranger is an event. Everyone knows all about everyone else and is keenly sensitive about what other people think of him. Most people can be kept in line simply by public opinion and those who cannot can be dealt with by the old American institution of "running out of town." City populations not only are large but they always include a great many strangers: people who have no ties and who cannot be reached by public opinion. To make matters more complicated, the people who move to a city usually are not the ordinary run of country folk: respectable God-fearing conservatives. Cities draw those who do not fit into village life either because they are more ambitious and able than their neighbors and willing to take a chance to better themselves, or because they are ne'er-do-wells and bad characters who cannot stand close watching. How to control this floating population is a problem we still have not solved too well, but it is interesting to note that the oldest cities from which we have written records already had police forces and magistrate's courts. It is also interesting that the oldest law code in the world, that of Hammurabi of Babylon, 2050 B.C., prescribes penalties for saloon keepers who let bad characters frequent their houses without notifying the police.

There were four main centers in which civilization developed earliest: Egypt, Mesopotamia, northwestern India, and northern China. The first three of these lay close to the region in southwestern Asia which saw the beginning of agriculture and the development of our four basic inventions: the plow, the loom, the wheel, and metalworking. Mesopotamia was probably the first to build cities, with Egypt and India following along. Each country built up its civilization on the common foundation of the available knowledge and invention, but each went on from

there in its own independent fashion and developed a distinct culture of its own. In all these regions city life was fairly well developed by 3000 B.C. Chinese civilization, since China lay farther from the original center (and it must be kept in mind that the reason people in other parts of the world were more backward was not because they were less intelligent but because they were cut off from the centers where civilization developed), did not develop until about a thousand years later, but once it started it came forward with a rush. By 1000 B.C. it was well up with its western competitors; and China, in spite of the fact that it has been conquered and overrun many times during its long and turbulent history, has maintained its high level of culture more consistently than any other of the world's great civilizations.

Although we cannot be sure why civilization developed first at these points, one thing is highly significant. All the earliest civilizations were located in river valleys where the soil was rich enough to make a large settled population possible even with the crude agricultural techniques of that time. Egypt was the most favored country in this respect, since the Nile floods each year and when it recedes leaves a coating of rich silt upon the adjacent lands, so crops grow lushly without fertilization or irrigation. The Tigris and Euphrates, twin rivers of Mesopotamia, were less docile than the Nile. They flooded wildly and irregularly, like our own Mississippi, and one extra-bad flood seems to have been the basis for the Bible story of Noah and his ark. Most of their lower valleys were swamplands, but once men had learned to drain this and to control the worst of the floods, this territory gave bumper crops year after year. In fact it remained some of the richest farm land in the world until the Mongols invaded it and destroyed the irrigation system which had been in use for at least five thousand years.

The earliest civilization in India arose in the Indus valley and the first Chinese one in the valley of the Hwang Ho. While such river valleys provided an abundance of food, they were usually lacking in many of the raw materials which even a simple peasant population must have. Intensive cultivation of the land soon produced a shortage of timber and fuel, for trees cut down to make way for planted fields have no chance to grow again. Also, the sort of good rich soil which grows grain provides no stone with which to make sickles to cut it or mills to grind it. So the valley people very soon began to trade their grain to the hill people for wood and stone. When metal came into use, still more distant trade was required, for metallic ores are found only in a few localities and usually in places that are not good for farming.

Their rich soil gave the valley people a large surplus of food to trade with and they soon developed methods for long-distance exchange and transport of bulky goods. This was not too difficult as long as the trade was up and down river, but became a serious problem when such things had to be carried over land. Here was where the wheel came in, for without it much of the long-distance trade and transportation would have been impossible. Although we hear a great deal about war chariots in these early times, the humble cart was much more important. Also, carts required roads, or at least level country, and this led to the establishment of regular trade routes. Where such routes crossed, or where goods had to be shifted from carts to boats or vice versa, business was sure to be good and more cities sprang up there.

The abundant food supply and settled life of the rich valleys also encouraged specialization in industry. The economic surplus of the group was great enough to support many more people than were required to work the land, so more of them could turn their hands to other things. At the same time, the dense settled

population made it possible for people to count on such specialists when they needed them. A man did not have to know how to mend his own plow or a woman to make her own cooking pots since there was always someone close at hand who could do these things for them for a measure of grain.

The first cities grew out of a combination of this trend toward craft specialization, together with the development of techniques for transport and trade. As time passed, the role of the cities as trading centers became more and more important. The villages could produce more food than they needed, while the city produced more manufactured goods than it needed. The villagers brought their surplus food and raw materials to the city to be exchanged for manufactures. Soon every city had its market place where not only city people and villagers but also people from different villages met to trade. In the city also goods which had been brought in bulk from distant regions were sold at retail. It was not so different from present-day American life with the farmers and small town people coming to the city once a week to shop in the big stores, go to the bank, see the dentist, and take in the latest movie. The country people were farmers and unskilled laborers, the city people merchants and artisans with, as time went on, an increasing number of administrators and what we would call professional men.

In Egypt and Mesopotamia all these professional men were, at first, priests attached to the service of some god or other. The people of these regions were deeply religious and each city had its own god or goddess. The city people did not think of their deity as being the only god, but they regarded him as their special helper. In many cases they thought of him as a sort of landlord who owned the city's territory and permitted the people to live on it and use it in return for the payment of rent. This rent was a certain percentage of their crops or profits.

The god's establishment was by far the largest in the city and usually had magnificent living quarters for him, complete even to a collection of human wives. It also included ample storehouses to keep the goods which were paid in and even factories to work up the raw materials donated by the villagers. We know from some of the Mesopotamian temple accounts that the god's wives were kept thriftily at work spinning and weaving the wool given to the god so the cloth could be sold at a larger profit. These city gods were the first corporations, with the priests managing their affairs as a board of directors. Since the god never died, the corporation went on generation after generation amassing wealth and gathering more and more power into the hands of the god's representatives. Priests were allowed to marry and to live very much like other people and ambitious young men went into the priesthood as the best way to get ahead in the world. The service of the god was so profitable that it drew the best and shrewdest brains in the community, generation after generation, and the bulk of the community's wealth and learning came to be centered in the temple.

While records are helpful to any trader, a small businessman can get along without them. Many country storekeepers handle their merchandise without keeping books and turn up with a profit at the end of the year. However, the business transactions of the city temples soon became so complicated that no man could carry them in his head. They not only bought and sold but also loaned money at interest and gave smaller traders goods on credit. If some priest was suddenly removed by death or accident, no one else would know what his negotiations had been and he would leave his affairs in a hopeless tangle. The priests probably believed in their duty to keep the god's affairs in good order quite as genuinely as a modern board of directors believes in its duty to the stockholders. The temple's transactions soon passed

beyond the stage where they could be done without bookkeeping and it seems to have been the need for bookkeeping which first brought writing into practical use. The very earliest written records which we have are temple accounts.

Even before the first cities were built people in many parts of the world were drawing pictures of things to help their memories. However, true writing began in the great valley civilizations and seems to have been developed independently in each of them in response to the same needs that came with city life and trade. It began as a priestly art both because the need for it was greatest in temple trade and because the best minds were, for the most part, attached to the service of some god. Even when, in the course of time, there came to be a group of professional scribes, the odor of sanctity still clung to them and they were regarded with awe by the rest of the population. Early writing was so complicated and so difficult to learn that it remained very much of a mystery to the common man until after the invention of the alphabet. The first writing was in the form of conventionalized pictures, each of which stood for some idea or thing. It had no relation to sound and the scribe had to memorize an endless series of these pictures. Each civilization had a different system of picture writing so that if one could read and write one's own language it was no help in another country, even though one could speak the foreign language.

The first step toward simplifying this system came when scribes began to use pictures of things which had single syllable names to stand for the syllable rather than the thing itself. This sort of writing is called rebus writing and we still use it sometimes in making puzzles for children. In such a puzzle a picture of an eye will stand for the word I, a picture of a can of tomatoes for the verb can, and so forth. Most languages can be written with two or three hundred syllable pictures of this sort and most of

the early systems of writing stopped their development at that point. The Egyptians went a step farther and developed signs which stood for single sounds, but they were a conservative people and their scribes took on the new inventions without dropping any of their older system of writing. In Egyptian hieroglyphic words are written with a mixture of simple picture writing, syllable writing, and single sound writing, the same word often being represented all three ways at once so there can be no mistake. We do not know why they kept this clumsy system, but it may be that the scribes, for whom writing was something of a trade secret, did not want it to get too simple or too easy for outsiders to learn.

The first written records that have come down to us were made about 4000 B.C. but it was not until about 1800 B.C. that anyone thought of an alphabet, that is a series of signs each of which stood for a single sound and nothing else. At that time the Egyptians were carrying on mining in the Sinai peninsula and hiring a great many of the local people to do the digging for them. They sent scribes to keep the regular accounts in hieroglyphics, but the foremen of the various mines, who were natives, also had to keep simple records and make reports. These foremen took the Egyptian symbols which stood for single sounds and changed the meanings of some of them so that they would fit the sound system used in their own language. They abandoned the rest of the complicated Egyptian system of writing, probably because it was too hard to learn, and presently were saying everything that they had to say with twenty-one simple little drawings, each of which stood for one sound. This was the great-grandfather of all the alphabets used in the world today. The natives of the Sinai peninsula were nomad herdsmen and when the mining ceased they scattered over the neighboring regions taking their alphabet with them. Some of them went to Palestine, where the local



THE FIRST COURTS OF LAW

and law courts began in the cities of the New West. Hearings were usually held in the open air, and even the first courts had a magistrate and a judge to keep the records. All disputes had to be settled by someone who was a stranger to both parties.

people soon got the idea. The oldest alphabetic inscription of any length which we have comes from Palestine in the ninth century B.C. The Phoenicians, who lived on the eastern shores of the Mediterranean and were a great trading people, carried the alphabet to Greece, the Greeks carried it to Italy, and so on until it had reached most of the world. Since with an alphabet anyone could learn to read and write in a few weeks, universal education now became possible. The alphabet took learning out of the hands of the priests and gave it to the people.

It seems that once the patterns of city life had been established, the development of the rest of civilization went on with surprising speed. Within at most a thousand years after the first cities were built, civilized peoples had established patterns of life which remained very much the same until the coming of the machine age, only about three hundred years ago. After the first burst of development, which brought new elements into the culture and required people to make all sorts of readjustments, there was a long period in which growth was slow and changes were few. Except for the alphabet, it is hard to point to any new basic inventions during this period. Instead there was a steady improvement in the techniques that had been learned and a better and better adjustment between the elements of culture which had already taken root.

Also, during these years of adjustment each of the original centers of civilization became a center of diffusion from which the advances which had been made there were carried to more backward regions. Thus the type of civilization which had developed first in northern China spread gradually to what is now southern China, to Korea, and finally to Japan. The Indian civilization spread to southeastern Asia, while certain of its elements, in the hands of Buddhist missionaries, were carried to Tibet and finally to China, where they brought a new vigor to

Chinese civilization. Elements from Mesopotamia and Egypt spread westward, reaching first the Greeks and then the outlying barbarians of Europe, who were our own ancestors. Since the north Europeans lay far from all the early centers of civilization, they came to it late. The first cities to be built in Europe were as much younger than those of Egypt and Mesopotamia as New York is younger than Rome.





Chapter 6

ISLAM AND INDIA

Societies, like individuals, always have their special interests. Just as one man may be interested in Big League baseball and spend his spare time and money at the ball park while another devotes his leisure and funds to a postage stamp collection, so different societies have divergent interests and spend their energy and economic surplus in different ways. As a result, the cultures of different societies grow in different directions. Just what starts a society off along the lines of a particular interest is a question we still cannot answer. All we know is that each of the great civilizations developed certain aspects of its culture and neglected others.

Thus the people of India became involved with the spiritual life and developed the most complicated systems of religion and

The drawing above shows an Indian Holy Man. The Indians put such a high value on spiritual matters that the Holy Man, with his begging bowl and monkeys, was more highly esteemed than the rich merchant with his money bags.

philosophy the world has ever known. The people of China, on the other hand, are much concerned with social organization and government. We of the Western world give our greatest interest and enthusiasm to technology and have a concern for mechanical things—automobiles, radios, and electrical devices—which seems quite ridiculous to the thoughtful Indians or Chinese.

It was our interest in machines and material things, however, which enabled Europe and America to take the lead in the modern industrialized world, for we were the first to take over science and technology. This does not mean that the peoples of Asia and Africa have fallen hopelessly behind in the march of progress. Japan, the only Asiatic country which was interested in becoming mechanized, mastered Western technology in three generations. These peoples who come to the machine late may adapt even more rapidly than we did, for they can avoid the wasteful experimental stages which we had to go through in the early days of manufacturing, and profit by our mistakes. The far-reaching changes which the machine brought about are by no means worked out; this disturbed world is still floundering in the chaos and confusion caused by the sudden introduction of a new way of life made possible by mechanization.

Europe is a relatively young country, as world civilizations go, and America a mere infant. We have been able to dominate the world in the last few centuries because we had weapons and machines while the older civilizations, which had less interest in material things, did not. However, as communication and transportation make the world constantly smaller, Americans and Europeans are going to have to learn to meet the people of other civilizations as equals and competitors. We are familiar with the background of our own culture and tend to take its particular preferences and prejudices for granted as the natural and normal way of life, but in this constantly shrinking world we Westerners

should know something of the origins and social history of the great non-European peoples of the world, for we are sure to be in closer contact with these people during the coming years.

Among all the great civilizations in existence today, that of Islam has the longest unbroken history: Islam is what we mean when we talk about the "unchanging East." The civilization is called Islamic because most of its people follow the teachings of Mohammed, and Islam is the name for the religion he founded and which is still flourishing in North Africa, Egypt, Arabia, Turkey, Persia (which we now call Iran), and much of India.

It was in these regions that civilization first appeared, and in the thousands of years since then the life of the peasants in the back districts has changed little. They still use the same sort of tools and utensils which archeologists find in the ruins of the world's first cities. A few years ago a friend of ours bought from a Persian shepherd a newly made club of curious form exactly like one shown on a Sumerian monument carved in 3200 B.C. Even the beliefs and practices of the common people in these regions are often of incredible antiquity. Thus, in Egypt today, the peasants believe that one of the best cures for a sick child is to cook a small mouse and make the child swallow it whole. In cemeteries of 5000 B.C. the skeletons of mice are often found lying inside the skeletons of small children, proving that the belief in this strange cure has endured for five millenniums, although it apparently proved fatal to those long-ago infants dug up by the archeologists.

"Islam," which means "submission to the will of God," is a fairly recent term for this region. Mohammed was born more than six hundred years after Christ and Islam is thus the youngest of the great world religions. It became powerful in the seventh century A.D. when the Arab tribes which Mohammed had converted set out to conquer the Near East. This region at that time

was divided between two great empires: the Persian Empire and the Eastern Roman Empire, which had its capital at Constantinople. These had been great and high civilizations. The Near East peoples were the first city dwellers and were skilled in trading and manufacture and in the arts of government. When the empire of the Medes and Persians, which united Babylon, Egypt, and Assyria, was overthrown by Alexander the Great in 332 B.C. the Greeks' knowledge of art, science, and philosophy was taken over by the conquered Persians and the Near East and Greek civilizations soon blended to form what we call the Hellenistic civilization. This spread not only over Greece and the Near East but was also carried westward, where the Romans took it up and introduced it into western Europe. Much of our own way of life before the coming of the machine age traced back to this Hellenistic civilization.

At the time when the Islamic Arabs started on their conquest, however, the two great Near Eastern empires of Persia and Rome had been fighting each other for so long that they were exhausted. Though the Arabs were few in numbers, they were very good fighters and there was no one strong enough to oppose them. But since the Arabic conquerors had no experience in governing empires and since they were outnumbered by the conquered people, they gradually took over the civilization of the people already there, instead of imposing their own culture upon the vanquished.

The only things which have come down from the Arab conquerors are the language and the religion. The Arabic language survived because it has to be used in all religious services, just as Latin is used in the Catholic Church. To this day it is the language of educated people in all Islamic countries, much as Latin was in Europe in the Middle Ages. The Islamic religion, like Christianity, has broken up into a great number of sects, but all

these sects insist that there is only one god, Allah, and that Mohammed is his prophet. Mosques, the Islamic churches, are to be found in every village and every quarter of the city. The typical mosque has a courtyard surrounded by shady cloisters and with a fountain in the center where the faithful may wash before prayers, as the creed requires. Images and pictures and music are strictly forbidden. The service usually consists of reading from the Koran, the Bible of Islam, prayer, and sometimes a sermon. Believers are required to make at least one pilgrimage to the sacred city of Mecca in Arabia and there are also many rules of diet and dress which must be strictly followed. Islam has a high ethical code and stands quite as much for a particular way of life as it does for a religious creed.

The modern Islamic civilization is already beginning to feel the impact of the machine age, and in most Islamic cities there is a strange mingling of the old and the new. When we were last in Egypt many of the natives owned and drove automobiles, but they hung strings of blue beads around the radiator caps to protect their cars from the evil eye. Most of the men still wore robes, but beneath them they wore silk socks with the brightest garters they could find. The things which have changed least have been the ways of trade and business, the patterns of family life, and the religion.

The ancestors of the Islamic peoples understood big business and banking at a time when our own ancestors were just beginning to settle down in villages. Islam has a capitalistic society which has as great a respect for wealth and craftsmanship as our own. All through Islamic history, great fortunes have been rapidly made and lost, and people rise and fall in social position with almost as much ease as they do in American society.

Scholars and priests are respected by the great merchants who hold the real power. Manufacturing is organized into guilds with

master craftsmen and hired helpers, much as it was in medieval Europe. The Arabs are shrewd merchants and love to bargain. If a buyer pays the first price asked, the seller is certain his customer must have secret knowledge of some special value of the goods and is cheating him.

Patterns of family life in Islamic society differ considerably from our own. Mohammed apparently held no very high opinion of women and the Koran allows them very little freedom. Women's place is in the home. When the women do go out, they are veiled to the eyes and bundled into shapeless robes. Sometimes the wife of a poor man will be driven to go unveiled upon the streets to sell vegetables or peddle wares but this is a disgrace and she yearns for the time when her husband can afford to lock her up respectably at home. Harems, such as one reads of in the Arabian Nights or sees in the technicolor extravaganzas featuring Maria Montez in the movies, are very rare.

Although the Koran does allow a man to have four legal wives and as many concubines as he wishes, in practice very few men avail themselves of this doubtful privilege. Wives are expensive and each one must have her own quarters and servants. Also the position of a polygamous husband is a far from happy one. If his wives are congenial, they will combine forces against him to get their own way in the household; if they dislike each other, most of his time at home has to be spent in trying to keep the peace and patch up quarrels. Women have a great deal to say in Islamic countries, even though they have to do their talking behind closed doors, and henpecked husbands are not unusual.

The Islamic husband, however, has one powerful defense against his wife's nagging. He can get rid of his wife legally merely by repeating three times, "I divorce thee!" The unfortunate woman then has to pack up and leave the house and her children and go back to her father. While the threat of such di-

divorces makes a fine climax for family quarrels, few men actually take advantage of the regulation. The all-time record for marriage is held by one Mohammed Ibn-et-Teiyib, a cloth dyer of Bagdad, who is said to have been legally married to nine hundred women when he died at the age of eighty-five. Actually, however, since wives have to be paid for with gifts to the families and there is no refund if they are divorced without just cause, only a very rich man can afford to indulge in these easy divorces. A man who in a fit of temper cast off a wife who is a good housekeeper and mother by shouting three times that he divorced her, usually takes it all back the next morning. The position of women is not an enviable one in these lands, however, and while their emancipation will no doubt come about in the course of time, it has scarcely begun at present.

To live in an Islamic country today is much like stepping back into the Middle Ages, but Islam is beginning to take over modern science and technology. The religion of Islam is also undergoing a reawakening much like that of Christianity at the time of the Protestant reformation. Its doctrine of the brotherhood of all true believers is no empty phrase and makes no reservations based on the color of a man's skin. Islam is spreading rapidly among the Negroes of Africa and may well become a rallying point for resistance to European domination.

Kipling's phrase, "East is East, and West is West, and never the twain shall meet" is frequently quoted and accepted as if the East were all one civilization. Actually the civilization of India differs from that of Islam quite as profoundly as it differs from our own. By the civilization of India we mean that of the Hindus. India today is an incredible mixture of peoples and cultures, but the Hindus are by far the largest single element in the population and give character to the whole. Although the Indian and Islamic civilizations are very much alike in their technology, they are not

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PERSIAN HUNTING SCENE

at all alike in their organization of society or in their outlook on life. In these respects the Islamic civilization is much more like our own, the Indian civilization totally different. This is one reason we find it so hard to understand what is going on in India today. European civilization could never produce a man like Gandhi or a doctrine of passive resistance like that which he teaches.

One of the greatest difficulties which confronts the student of Indian history is that the Indians themselves were never very much interested in history and have kept few records of events. Although India seems to have been civilized quite as long as the Near East, there are no inscriptions of any importance before the third century B.C. and even those made after that give us little information on what was happening or on the daily lives of the people. Some of them tell of kings and heroes, but we can only guess at the dates. The first writings of any historic value are those of Greek visitors who came to India with Alexander the Great and shortly thereafter. For the period before that we have to rely on the findings of archeology and on traditions handed down by word of mouth.

Civilization began first in northwestern India, in the Indus Valley, and seems to have been as old here as in Mesopotamia or Egypt. These first civilized Indians knew how to write but they wrote on perishable materials, all of which have been destroyed by the climate. By 3000 B.C. there were great cities in the Indus Valley, with well-built brick houses, public baths, and what seem to have been public buildings. However, no temples have been found so far, which is surprising in view of the later development of Indian civilization and the great stress it laid on religion.

After flourishing for at least a thousand years this civilization began to decline and was finally overthrown and blotted out by barbarians, who came down from the north sometime between

1500 and 1000 B.C. These barbarian invaders were the Arya, the people from whom the much abused term Aryan has been taken. Most of the ruling groups among the modern Indians claim descent from these Arya and also attribute to them the beginnings of the Hindu religion. The language of the Arya, Sanskrit, belongs to the same Indo European family as English, Latin, and Russian, and is one of the oldest members of this family.

Like most conquerors, the Arya exalted their own virtues and gave uncomplimentary and strongly biased accounts of the people they found in India when they arrived. They described them as black, flat nosed, and generally inferior, but also as clever and treacherous. However, with the ruined cities of the Indus Valley people before us, we cannot doubt that their builders were higher in the scale of civilization than the lordly Arya.

The caste system is the most distinctive feature of Indian civilization and the one most baffling to Europeans. There are four formal categories of caste: Brahmans, the priests; Kshatriyas, the warriors; Vaisyas, the craftsmen; and Sudras, the servants. Actually, however, there are thousands of castes in India. Every occupation has its own caste and no Hindu would think of doing any job but the one to which he is born. A friend of ours, visiting in India, was once awakened in the middle of the night by yowls and mewlings under his bed and discovered that the hotel cat had picked that spot to have a litter of kittens. He rang for the steward, who came, looked the situation over and then announced that though it was his duty to make the bed, the kittens were on the floor, not on the bed, and therefore they should be removed by the sweeper, not by himself. He went off to wake the sweeper, while our friend got up, removed the cats himself and went back to sleep. It is this sort of thing, repeated on a larger scale all over India, which makes the caste system such an effective block to progress. Mechanization and the installation of factories in

India, instead of breaking down caste distinctions as might have been expected, merely created a whole new set of castes: a welders' caste, a machinists' caste, etc.

A caste is really sort of a hereditary labor union. Its members are born to it, all pursue the same occupation, and marry only among themselves. There is a caste council which fixes prices, settles disputes, and which can expel members permanently. This is a very severe punishment, for it is impossible for an expelled caste member to join another caste, even a lower one, and an outcaste has no way of making a living in India. Since each caste has a complete monopoly of its own trade and consequently no competition, it has no incentive to change its methods or accept new ideas. Caste specialization extends to all phases of life with equally paralyzing effect.

In the ordering of the castes the Brahmans, that is, the priests and learned men, have been given the highest place, and they have found a highly convenient means for rationalizing and perpetuating the caste system in the doctrine of reincarnation, which has become the core of later Hindu religion.

Briefly, the idea is that each soul is born again and again into different bodies. Life and death alternate for the soul like night and day. The life of any day is determined mainly by what has happened on previous days; the work remaining to be done, the debts to be paid or collected; in fact the whole carry-over of the past. Similarly, each reincarnation is controlled by what has happened in past reincarnations. Evil deeds must be balanced out by good ones while good deeds are rewarded by happiness and success. As the soul becomes wiser and acquires an increasing balance of good, it will be born into better and better circumstances, which means as a member of higher and higher castes. Finally, after hundreds of incarnations, it will attain to saintship. The soul's rise can be speeded up by good deeds in the form of worship of various deities and liberality to the Brahmans, their servants.

This doctrine not only gave the priests a strangle hold on the whole society but also provided the members of the lower castes with compensations for their unfortunate condition. The operation of Karma, as this accumulation of good and evil deeds is called, is quite mechanical. A man is born into a particular caste because that is the exact position in society for which the past acts and experience of his soul fit him. It is as automatic as the process by which he inherits the color of his eyes. If he does try to change his caste he is foredoomed to failure since he will lack the qualities needed for him to make good in a higher one. Also, the act itself is a sin which will set his soul's development so far back that it will require many reincarnations to make up for it. On the other hand, if he accepts his caste obligations and carries on his caste occupation conscientiously, his next incarnation will be higher in the social scale.

Such a belief easily leads to fantasy-thinking, for its devotees can always escape from the troubles and discomforts of the material world by dreaming and speculating on a glorious hereafter. The ruling caste, the Brahmans, encouraged and rationalized these dreams and speculations, for this perpetuated the caste system and kept the people from being discontented with their lot. Thus the Indian civilization has gone farther than any other in religious and philosophical matters, but in turning its main interest to spiritual considerations it has turned its back on exactly those things which our own civilization admires most, technical achievement and progress. India will undoubtedly be much slower than Islam will be to accept western science and technology and these ideas and methods will cause much more disruption in Indian civilization than in almost any other group which has come late to the machine because of the strong grip which the caste system and religious thought has upon the whole social structure.



Chapter 7

CHINA AND JAPAN

Chinese civilization, though generally regarded as being of great antiquity, is relatively young as civilizations go. As late as 2500 B.C., when great cities were flourishing in Mesopotamia, the Chinese were still simple hunters and food gatherers, living much as the North American Indians did before the coming of the whites. However, as soon as patterns of agriculture and village life spread eastward to China by way of Turkestan, Chinese culture developed rapidly, and by 1500 B.C. there were walled cities in northern China around the great bend of the Hwang Ho River.

The Chinese date their successive cultural periods by dynasties and this first period is called the Shang dynasty. It was a feudal society, much like European feudalism, with the peasants raising

The drawing above shows a Chinese pottery kiln. The Chinese learned to make fine, beautifully decorated porcelain at a time when the rest of the world had only crude pottery. When the porcelains were traded to the Western countries, they were called "china," a term we still use for our table-ware.

the food, doing the work, and paying the taxes, while the aristocracy rode off to war in chariots. They had an emperor, but he had little power over the princes, who were constantly raiding each other, as well as invading the territory of the nomads who lived in the neighboring grasslands. In later times the nomads became powerful and swept down upon the Chinese cities, but in the Shang period they were the victims; their herds were raided and themselves frequently carried off as human sacrifices.

The emperor's power over the princes lay chiefly in the fact that he owned certain sacred objects which were essential in the ceremonies which had to be performed to insure good crops. When one of the other princes could lay his hands upon this important ritualistic paraphernalia, he would set himself up as the new emperor.

The Chinese have been fine artists and craftsmen from earliest times. The Shang people made use of all the metals, except iron, and cast bronze with a skill which has never been surpassed. They made fine pottery and beautiful carvings in jade, which they regarded as a magical material, an idea which has persisted in Chinese history. Although they had no great temples or organized priesthoods, which in other civilizations were the centers of the beginning of writing and the scholarly arts, the Chinese developed writing soon after they learned settled living, and the princes all had professional scholars attached to their service to compose their correspondence and keep governmental records.

We would know little of the life of the common people were it not for a superstition which unintentionally provided archeologists with a record of daily activities. When the Shang Chinese wanted to foretell events, they scratched a question on a piece of bone and held it over the fire. The answer could be interpreted from the pattern of cracks which appeared in the scorched bone.

This sort of divination was very popular, and, since bone is a durable material, quantities of these oracle bones have been found, inscribed with questions about everything, from whether or not it was advisable to declare war on a neighboring state to queries about what was a favorable hour for planting rice.

The diviners also noted on the bones the results of the divination, and often also a check on whether or not the answer had been correct. One bone, which had been used to ask what the weather would be for the prince's hunting party, prophesied rain. The diviner later added, "And it really did rain."

Chinese writing began, like all writing, with simple, stylized pictures of things and went on to attach sound values to these pictures. In the west the sound values were worked out more and more accurately until they developed into an alphabet, but in China, for some unknown reason, sound values remained unimportant. Instead, the Chinese combined several of the original simple pictures to form an elaborate character which stood for a particular thing or an idea. About thirty thousand of these characters are used today by Chinese scholars and to be even literate in China one must be able to recognize and write at least ten thousand of them. Since this requires years of study and memorization, it is not surprising that a large percentage of China's population are still illiterate and that a system of universal public education has never been established.

This system of writing has made the writing of the language, in itself, something divorced from speech. An American who has studied Chinese characters can read a Chinese book even though he cannot speak a word of Chinese. Since Chinese, Japanese, and Korean scholars all use this system of writing, they can read each other's works with perfect understanding, even though their spoken languages are quite dissimilar and they would be unable to talk to each other.

Although different styles of Chinese writing have developed and some of the characters have changed, a modern Chinese scholar can read a classic of the fourth or fifth century B.C. with much less difficulty than we can read an Anglo-Saxon manuscript or even something as recent as Chaucer's *Canterbury Tales*. Since these classics are the foundation of much of Chinese religion and philosophy, it is much as it would be for us if the New Testament had been written by the apostles in colloquial English. We cannot say which was cause and which effect, but the Chinese system of writing and the Chinese interest in history, respect for the past, and willingness to imitate it certainly have gone hand in hand.

By 500 B.C. we find the Chinese sages already mourning the passing of the good old times and trying to bring them to life again. By this time several of the most important patterns of later Chinese life were already in existence. Except for the state sacrifices, religion was an individual matter and one to which the average person did not pay much attention. There was no conflict between Church and State since there was no organized Church. There was a profound respect for scholarship and learning with rewards in prestige if not in cash. The Chinese scholar, then as now, stood at the highest point in the social ladder. He served the prince, but the prince honored him and knew that their reputation through future generations depended on him. Moreover, the scholar had to reach this eminence by his own abilities. The son of a scholar could not become a scholar himself unless he had intelligence and acquired the learning, while the son of a peasant might become a scholar and adviser to the emperor. There was also an extreme development of etiquette. There were rules of polite behavior for all possible relationships and situations. A gentleman knew the correct way of doing everything, from greeting a prince's second concubine to committing

suicide. To a very large extent, Chinese civilization has substituted the idea of bad manners for that of sin.

In China, the feudal period came to an end about the beginning of the Christian era. The old titles of nobility survived but the nobles had little more political power than those of England do today. The empire was consolidated and all power was centered in the emperor. The Chinese were now confronted by one of the most important problems of civilized life; how to organize and administer great units of population. This is a problem which we ourselves have solved very imperfectly, perhaps because it is so new to us. Until about four hundred years ago all European states were small in both area and population. A nation of ten million people was a giant and a city of fifty thousand a metropolis. The first Chinese census, taken about the beginning of the Christian era, shows a population of over two hundred million with single cities of a million population.

One of the greatest difficulties in administering such huge units of population is to keep tab on individuals. In cities in particular it is easy for individuals to lose themselves in the mass and to escape the informal social pressures which keep people in line in small communities. The Chinese solved this problem by their family organization, carrying over into a civilization nearly as complex as our own a type of family commonly found only in less advanced cultures. The Chinese peasant family actually is very much like our own, except that the father has rather more power. However, the peasant counted little in the Chinese scheme of government except as a source of taxes. It was the officials who had to be controlled and there was a pattern of upper-class family life which aided greatly in this.

The upper-class Chinese family does not consist of a man, his wife, and children, but of all the male descendants of some important man together with their wives and children. This group,

which may include a hundred or more persons, lives in a single establishment under the rule of the oldest male member. The resources and income of the family group are pooled and redistributed to the members according to their needs. The whole group profits by the honor or success of any member and is, at the same time, held responsible for any crime which a member may commit. If the real criminal escapes, another member may be punished in his place. Ancestor worship gives the family an added hold on its members, since to be disowned means disaster not only in this world but the next. The spirit who has no living family receives no sacrifices.

It is easy enough to work out on paper a system of government which will be suited to the handling of large populations. The real difficulty comes in finding men who are able to administer it. Most of the trouble in our own elective system comes from the fact that our various electoral units are so large that it is impossible for most of the voters to know candidates personally. How can a city dweller choose intelligently between two men, neither of whom he has ever seen and about whom he has heard nothing before election? The Chinese seem to have realized this difficulty very early. The central government left the villages to govern themselves on informal, democratic lines with no officials except a headman, chosen by the villagers, whose main duty was to see that taxes were paid. On the other hand, posts in the over-all administration of the empire were filled by imperial appointment.

The obvious evils of this system were met by a regulation that appointees to all important posts had to be drawn from a rigidly selected group whose membership was recruited through competitive examinations. These examinations were open to all men in the empire and the son of a poor peasant could take the highest honors and be appointed to one of the highest posts in the bureaucracy. The examinations themselves were based on classical

scholarship. They did not reveal the candidate's technical training for a particular post, or his lack of it, but they did reveal his general intelligence, much like an I.Q. test. Perhaps their nearest European parallels would be the British examinations for entry into the Colonial Service. The small group who were able to pass the Chinese official examinations might be ignorant of their duties at the time when they received their appointments, but they were certain to have brains enough to learn these duties and to execute them capably.

Actually, the Chinese government functioned with surprising efficiency as long as the emperor limited his appointments to men selected by the examinations. The system broke down only when a weak or bad emperor began to fill government posts with favorites. It is true that even under the best emperors graft was rampant, but it was better organized than it was in the city of Chicago at the height of the Thompson administration. Everyone had to pay a rake-off, but to whom it should be paid and the proper amount to pay were governed by customs which were as binding as laws. Graft was thus a part of the merchant's predictable overhead. Rapacious officials were kept in check by a board of government examiners who moved about and dropped in unexpectedly to hear complaints from the governed and to check up on accounts. Moreover, such investigations did not result in the official's retiring from public life to enjoy his loot. If the charges against him proved true, he retired from life permanently, and usually in a painful way.

Although the Chinese have always been keenly interested in aesthetics as well as scholarship and have developed an art which many critics feel is superior to our own, the whole tone of Chinese culture has always been practical. In religion, there have been few Chinese mystics. In philosophy, the stress has always been laid upon conduct and the relations between individuals

rather than on abstract ideas. Craftsmanship of all sorts has been admired and the beauty of Chinese handiwork is so well known as to need no description. Until the coming of the machine age their technology was certainly as good as anything in Europe. It is hard to see why they failed to develop machines and scientific research for themselves, for both would seem perfectly fitted to their dominant interests.

Perhaps the reason the Chinese failed to take these next steps is to be found partly in their tremendous respect for the past, partly in a particular world view. Although the Chinese have always been a practical people, they have lacked the desire for progress. They conceive of the universe, including human life, as something in a state of balance, a constant tension between two equal and opposing forces. These forces are not regarded as good and evil. They are more like the positive and negative poles of a magnet. The wise man does not take sides in this cosmic tug of war but tries to keep the two principles evenly matched in his own existence. His rule is moderation in all things and a maintenance of the balance. New things, which might disturb it, are to be discouraged. Man should not try to master fate but to understand it and adapt to it contentedly and with good grace. It is as hard for us to understand this attitude as it is for the Chinese to understand our constant striving for added control of the physical world.

By the beginning of the Christian era Chinese civilization had taken very much its present form and had become the heritage of over two hundred million people. By the time the Europeans began to extend their control over the world, these had increased to four hundred million. Moreover, this vast mass of humanity was trained and adapted to civilized life as no other group in the world had been. Centuries of city life, with its crowding and disease, and economic competition of unimaginable severity had

weeded out the weak and stupid, generation after generation. China had been conquered repeatedly but had always emerged triumphant and with little change in its civilization. The conquerors might be superior in war, in which the Chinese themselves were not greatly interested, but they soon proved themselves inferior in the quiet competition which began as soon as the fighting was over. The vast population under-lived their conquerors and out-traded them, sapped their strength, and finally absorbed them.

The Chinese of today come to modern civilization better equipped than any other non-European people. There is no other group in our world which can compete with them on the same income levels. Our own Asiatic exclusion laws were a confession of our inability to do so. No one who knows Chinese history can doubt that they will emerge triumphant from the present period of civil war and confusion. One of their own historians has pointed out that such periods of confusion have occurred at intervals of roughly eight hundred years throughout the whole of Chinese history and that they have always been followed by periods of cultural vigor and political expansion. When the Chinese once more emerge with a stable government and with modern science and technology added to their ancient civilization, they will stand in the front rank of world powers.

In contrast to China's record of more than two thousand years as a world power, Japan is a newcomer among the great nations. Indeed, it is amazing that she has become a great nation for she lacks most of the material resources on which power must be built. Until less than a hundred years ago the Japanese had always been a small nation living on poor islands. They knew that their neighbors were larger, richer, and more civilized than they were and this gave them what the psychologists would call an overcompensated inferiority complex. Throughout their whole

history they have been proud, sensitive, eager to learn from other nations but even more anxious to impress other nations. They have felt that the rest of the world looked down on them and have been determined to show this condescension to be undeserved. Whatever we may think of their methods, they have shown that few peoples in the world are their equals for ability or for drive.

The Japanese did not learn to write until about 300 A.D. (by which time the art was already two thousand years old in China) so they have no record of their own beginnings. However, there were traditions from much earlier times, and in recent years Japanese archeologists have done excellent work in unraveling their country's past. Although the Japanese islands were joined to the mainland during the glacial period, no people reached them until long after the last retreat of the ice. The first settlers came down into the islands from the north and had a simple hunting and fishing culture very much like that of the people of northeastern Siberia a hundred years ago. These first settlers were light-skinned, straight-eyed people with heavy beards and body hair. A small group of them, called Ainu, still survive in the northernmost Japanese island and they look very much like Europeans.

At a slightly later time, but still in the Stone Age, the southern islands were settled by a quite different people; a brown-skinned, lightly-bearded race very much like some of the present-day Polynesians and Malaysians. These people came from southeastern Asia and the adjoining islands. They brought with them the first agriculture, but they were, above all, sailors and fishermen. From them the modern Japanese inherit their fondness for the sea and skill in everything that has to do with it, their passion for cleanliness and bathing, their flimsy houses, quite unsuited to the cold climate of many of the islands, and many other elements of culture.

These southern immigrants fought with the Ainu and gradually pushed them back northward. Since the Ainu were ferocious warriors, the struggle continued for centuries and the two groups mixed their blood and culture along the shifting frontier between them. While the struggle was still going on a third race arrived in the islands, probably coming from Korea.

These last invaders were called the Yamato and the modern Japanese like to claim descent from them. Physically they were like the lovely ladies of the classical Japanese prints: a slender people with long narrow faces, heavy chins, small, straight noses and slant eyes. They intermarried with both the older groups. Centuries later the Japanese government encouraged scholars and skilled craftsmen from China, Korea, Indo-China and even India to settle in Japan and take native wives, so the ancestry of the present Japanese is almost as mixed as that of the present Americans.

The Yamato brought with them a knowledge of metalworking and of how to wear armor and fight with swords. They also brought the elaborate techniques needed for raising irrigated rice and thus laid the real foundations for later Japanese civilization. By the beginning of the Christian Era they had things well under control and had imposed their rule throughout most of the group.

Yamato society was very much like that of the Scottish Highlands in the old days. There were numerous clans, each of which held a certain territory and lived very much to itself. The members of each clan claimed descent from a common remote ancestor and the head of the clan was the man or woman who had the most direct line of descent, preferably through eldest sons. The original ancestor was supposed to be a god and his descendants' special guardian and helper against the members of other clans.

Free clan members fought and farmed, leaving the skilled crafts to small groups of slaves who were attached to the chief's

household. There were no professional merchants and hardly any trade across clan lines, each group trying to be economically self-sufficient. Although these early conditions changed later, some things carried on until modern times. Until less than a hundred years ago, fighting and farming were considered the only honorable occupations. Craftsmen stood low in the social scale and even artists were looked down upon while trade and business were regarded with such contempt that Japanese nobles professed not to know the value of coins of different denominations. Most important of all, until the recent Japanese surrender the Emperor of Japan claimed to be personally divine and still traces his descent from the Sun Goddess.

The clans fought among themselves and by the third century A.D. one clan was able to bring all the others under its rule. The chiefs of this clan then assumed the title of emperor and the line of hereditary emperors has run unbroken from that time to this. At first the emperors were strong and worked hard to advance their people. By this time the Japanese already knew something about China and had a great admiration for that country. The emperors encouraged the introduction of Chinese arts and crafts and, above all, of Chinese learning. In the seventh century they even sent embassies to China to study its civilization at first hand just as in the nineteenth century they sent them to Europe and America for the same purpose. There was even an attempt to reorganize the Japanese governmental system along Chinese lines, but this failed. There was no group of native Japanese scholars to become officials and the warlike nobles were too jealous of their power. However, they did succeed in introducing the costumes and etiquette of the Chinese Imperial Court and to this day the Japanese court is modeled on that of China twelve hundred years ago.

This willingness to learn from other nations has been charac-

teristic of the Japanese throughout their history. No other people have borrowed ideas as frankly and eagerly when the occasion offered. However, it is a great mistake to think of the Japanese as simple imitators. They have always kept a solid core of native customs and ideas and have worked over their borrowings to adjust them to this. Even the machines they have borrowed from us have been improved upon in many cases, while they have made real contributions to scientific knowledge.

In the ninth century Japanese history took a new turn. The emperors had gradually lost their power, but instead of a revolution and the founding of a new strong dynasty, what happened was characteristically Japanese. The emperors, who were already sacred, were made more sacred still; so much so that they could no longer take part in the crass business of ruling. No one might touch the sacred person of the emperor except to cut his hair and nails and even this had to be done while he was asleep. He ate from new dishes which were destroyed after each meal since his sanctity would make it dangerous for anyone else to use them. When he sat in state he had to look straight before him, since if he turned his head there would be an earthquake in the part of the empire toward which he looked.

Meanwhile, the real power became a prize to be fought for by rival clans, several of which took their turn at ruling Japan. The poor emperor was only a pawn in the power game. The head of a clan had to have him in his power in order to rule, but if the clan head was stingy the emperor might suffer real poverty. It was not until 1868 that this system was broken and the emperors of Japan once more assumed real power with a new sort of government modeled on European lines.

In the course of this long struggle for power between the clans, the Japanese developed many of the characteristics which eventually made them a menace to world peace. The population was

divided more and more sharply into a peasantry which farmed and paid taxes and a nobility who had no profession except war. A feudal system very much like that of Europe developed, but with one important difference. Instead of each little noble holding a patch of land and taxing his own peasants, taxes were paid to a great noble who then paid the small nobles, his vassals, what amounted to salaries. The right to such a salary was inherited by the eldest son, but if the great noble was defeated in war and deprived of his territory, everyone under him lost his income. The nobles thus had a very heavy stake in the wars of their overlords and courage and loyalty to the overlord came to be the greatest of virtues. They were expected to defend their master's interests to the death and were highly praised if they followed him even in death. When, in the fifteenth century, a clan chief who had revolted was defeated and committed suicide, eight hundred and seventy-seven of his followers did likewise.

Since a clan which had seized power was always threatened by rebellion, it could keep control only by the strictest discipline within its own ranks and by keeping a constant watch on its rivals. To complicate matters still further, the Japanese peasants were by no means docile. They often rose in revolt when taxes got too high. Every clan was trying either to keep power or to get power, so was constantly on what amounted to a war basis. In time there developed an elaborate system of government espionage and repression, with regulations of all sorts. Long before fascism appeared in Europe the Japanese had methods much like those of the German Gestapo and of nearly equal efficiency.

Foreign wars were also no novelty to the Japanese. They were daring pirates almost from the dawn of their history, while in later times Japanese *ronin*, poor nobles who sold their swords to the highest bidder, served in Siam, Indo-China, and the islands of the Dutch East Indies. There were several organized large-

scale attacks on Korea and in the sixteenth century the Japanese came very close to conquering China. Their recent bid for world domination is thus quite in line with their history. Its disastrous results may have cured them of the idea, but they had been thinking about it for a long time.

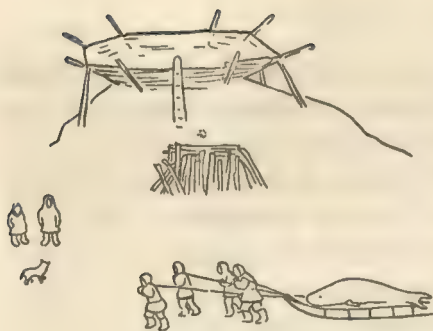
Most Americans know that Japan was closed to the outside world until the American Commodore Perry forced the Japanese to sign a commercial treaty in 1854. This seems so much at variance with the eagerness of the Japanese to learn new things that it requires a bit of explanation. The first Europeans to visit Japan seem to have been the Portuguese in 1542. For nearly eighty years thereafter Portuguese, Spanish, and Dutch traded with no difficulty and the Japanese showed themselves eager to learn everything they could from the foreigners. Unfortunately, this was a troubled time in Japan itself. When the Tokugawa clan was consolidating its power against strong opposition the European missionaries and their converts became involved in the clan struggles. Also, many Japanese *ronin* served as mercenaries in the European forces in the East Indies and what they saw of European activities convinced them that it was bad luck to let them get a foothold in Japan. The strict exclusion policy seemed the lesser of the possible evils. Even with the very severe penalties which the government enforced against Japanese who left the islands or had anything to do with foreigners, the interest in new ideas continued and European influence can be seen in various arts and crafts.

As soon as Commodore Perry's fleet had shown the Japanese that they were helpless in the face of a changing world, they set to work whole-heartedly to make up for lost time. The long training and discipline which they had undergone in preparation for war now stood them in good stead. They were able to carry through plans for changing their culture in a way which could

hardly have been possible in any other country. Within a single lifetime the face of the country was changed and the nation lifted from an obscure oriental country to a world power.

In spite of all this, the civilization of Japan as it existed at the beginning of World War II was an uncomfortable answer to those optimists who believed that with the spread of science and the machine all countries would soon be very much alike. The Japanese took over from Europe the things they thought they needed to compete with Europe and especially to defend themselves against her. They took over very little else. At the very time when they were trying frantically to modernize their industries and learn western science, they deliberately planned and carried through a revival of Emperor worship. Before their defeat, they were even more firmly convinced than the Germans that they were a superior race destined to rule the world. To justify this they did not use pseudo-science or propaganda about the inborn inferiority of other peoples, but based it on their being descended from gods and led by a god. After centuries of missionary work the Christianization of Japan was still as remote as ever. In fact, at the beginning of the war the old national religion of Japan, Shinto, was stronger than it had been for many centuries.

Only time can tell what will happen now. The Japanese of today must feel that, when they tried to take over from Western civilization the techniques they needed in order to catch up in the race for world power, they overlooked some essential elements. Let us hope that we can persuade them that the missing ingredients for success were democracy and love of peace. However, we can not make them feel this unless we make our own institutions truly democratic and work sincerely for a peaceful world. The Japanese have always been wise enough to borrow from other countries only those things which they could see to be working successfully.



Chapter 8

THE PEOPLE OF THE NORTH

At the time that Columbus discovered America not more than a tenth of the land occupied by human beings could be counted civilized. The cities clustered thick about the old centers where civilization had first sprung up in China, India, and the Near East. They were also scattered across Europe, although most of the European cities were insignificant affairs by modern standards, and along the southern shores of the Mediterranean. However, there was very little city living in Asia north of the mountain barrier which stretches east and west above India and cuts off most of the continent from the warm southern oceans. In Africa below the Sahara Desert, and in Australia and the islands of the Pacific there were no cities at all, while in the New World there were only a few small ones in what are now Mexico and Peru. There were plenty of people in all these cityless regions and most of them had developed ways of life which were well suited to the

The drawing above shows a Siberian village. The people of the far North built their houses partly underground for warmth and banked their roofs with earth. To keep out the bitter cold air, a single opening served for both door and smoke hole.

local conditions. Although these people were "uncivilized" in the technical meaning of the term, they were, most of them, much more advanced than our own ancestors before they took to city living. They had simply followed other roads in man's upward climb.

Among all these uncivilized people the ones which are of most interest to us are those who lived in that part of Asia extending from the mountain barrier north to the Arctic ocean. Men reached this region very early in human history, at least as far back as the time they reached Europe, but most of the territory was unsuited for settled living. There was plenty of game in the grasslands but it moved with the seasons so that the ancient hunters had to be constantly on the move to stay with the herds. In the forest belt the game moved less, but there was so little of it that it took a hundred square miles to support a single family. Even after the people in southwestern Asia had discovered how to raise crops and cattle these Northerners continued to live as **nomadic hunters.**

At first the long hard winters must have been a time of terror, since the deep snow made hunting difficult. However, there were many lakes and rivers in the region and the people learned to make winter camps at places where there were plenty of fish. Here they built pit houses, very much like old fashioned root cellars, and spent the winter months holed up, getting their food by fishing through the ice. Although they developed techniques for this which have never been bettered, it was a precarious business and settlements often starved before spring. Later, they developed methods for traveling in the winter. Some genius invented the snowshoe for walking in soft snow among trees, and the long ski for use in the open. They also invented the toboggan which was at first simply a broad strip of slippery bark curled up at the front end. Later came the sledge with runners. They had

had dogs from very early times and seem to have learned for themselves how to train these to pull the sledges.

The bitter weather and the active hunting life called for a special type of clothing and they learned how to tan skins with the hair on and to cut and sew these into close-fitting garments. They were the first people to make tailored clothing; the design of the standard male costume of a coat and a pair of trousers originated with these people. When the snow melted in the spring the whole territory became a maze of lakes and waterways over which people could travel long distances if they had boats light enough to be carried around rapids and across the divides between river systems. To meet this need they invented canoes of bark or skins, which are still the best thing for traveling in the far northern country. Everything considered, they did an excellent job of making the best of a bad territory and even today explorers in this far northern region find that they get along best when they copy the native way of life.

Even with all the skill which these people had acquired through thousands of years, life remained hard and food a constant problem. The game and fish in any region might fail unaccountably and the people of such a region would be wiped out unless they could move to some other place and find the people there ready to share with them. This led to the development of a particular form of social organization. In most other parts of the ancient world people drew together into close relationship groups which the anthropologists call *clans*. Membership in such a group was based on common descent in either the male or female line. The members of one clan had to marry people from another, but the children of such marriages had claims on the relatives of only one of their parents. People who belonged to the same clan would share and help each other but they would not help outsiders even when they were close blood kin. Among these north-

ern people such a system would have been destructive. Instead of developing clans, they reckoned descent in both the male and female lines just as we do. In fact, it seems to have been from them that our own European ancestors got this pattern, which is far from a common one. Since the northern people recognized blood kin on both sides of the house and as far back as they could remember, they could always find relatives who would let them hunt in their territory when their own failed, secure in the knowledge that the debt would be repaid when need arose.

Out of this system there arose still another feature of the northern society, one which was to leave its mark on later history. The only places where the food supply never failed were winter fishing grounds, and the custom arose of passing the rights to these grounds down from father to son in a single family. In most seasons there would be more than enough fish for everyone at such spots and the more men who worked there together the more fish could be caught. It was to the advantage of an owner to draw as many men into his settlement as possible. On the other side of the picture, the wide extension of kin ties which came with the recognition of relatives on both sides of the house meant that a man would be able to claim relationship with several different owners and to take his pick among several settlements. As a result, owners had to bid against each other for the services of the same poor relations and they did this by giving feasts and making gifts to their followers. The men who lived and worked in such a settlement would turn over most of their surplus to the chief, who was also the owner, but they did this, secure in the knowledge that most of it would come back to them in gifts. The hunting and fishing tribes of far northern America, whose ancestors came from this part of the Old World not very long ago, have kept up this system until very recent times.

The people of the grasslands were much more warlike than the

people of the northern forests and this made their chiefs' need for followers even greater. The larger the force a chief could lead on raids the greater his chances for victory and loot. With relationship reckoned in both lines the kin group was already so large and its limits so loosely drawn that it was a short step to the acceptance of men who were no relatives at all. By the time these grassland warriors began to raid the civilized peoples who could write about them, a new class of followers had come into being. These were free fighting men who attached themselves to any chief who was able to make it worth their while. They were bound to the chief not by ties of blood but by those of loyalty and personal devotion. The Romans have left records of such groups of "chief's companions" among the ancient Gauls and Germans, and they survived until much later times among the Vikings and in Ireland. The Irish Kings of the Red Branch and the Knights of Arthur's Round Table were free-lance fighting men of this sort and it was out of such beginnings that the patterns of medieval chivalry were developed.

The northern people traded with the grassland people from fairly early times, exchanging the furs which were their main product for tools and weapons, which were first of bronze and later of iron. Through this contact they learned metalworking, although they never became very good at it. They also copied the animal-raising techniques of the grassland people; but since their lands were so far north that ordinary domestic animals such as horses, sheep, and cattle could not stand the climate, they had to domesticate a new animal, the reindeer. Reindeer are picturesque but not too good for either milking or pulling loads. Taming them made life a little easier for the northern people, but no large population or elaborate culture could be built on a reindeer economy.

What little we know about the earliest inhabitants of the grass-

lands seems to indicate that their method of life was very much like that of the Upper Paleolithic people of Europe; the ones who carved and painted such good representations of animals. In spite of the ample supply of game, this region must have been hard territory for men on foot. Just as in our own High Plains, the winters were long and bitter, and camping places where fuel and water could be found were many miles apart. The population was probably smaller and its way of life simpler than that of the northern forests until three or four thousand years ago. However, the western end of the grasslands lay very close to the territory in which men first learned to raise crops and cattle. The same primitive farmers who laid the foundations for civilization in the great river valleys of the south also spread northward into the grasslands and laid the foundations there for a different sort of life.

The first ancient farmers who came into this region seem to have brought with them the familiar patterns of village life based on a mixture of grain raising and dairy farming with a few sheep to provide meat and wool. However, they soon encountered difficulties. The rainfall was not too heavy and, once more as in our own High Plains there were long cycles of drought. A series of moderately good years would be followed by another series of very bad ones when the crops dried up. Also, they soon found that their crops did best on new land, for they still had not discovered how to rotate crops or use fertilizer. Among the things that these settlers had brought with them was a knowledge of how to build wagons and how to use oxen to pull them. This made it easy for them to move and they soon developed a pattern of drifting from place to place, settling in one spot for a few years until soil exhaustion or drought drove them out, then packing up and moving on. They never had a chance to become really anchored to the soil, like the people of the southern river valleys, or to develop city life.

While this was going on in the moister western and southern parts of the grassland belt, especially in the region about the Black Sea, the villagers who had moved out to the drier parts of the grasslands changed their methods of life still more. There were great areas where it was too dry to get a crop of grain in most years and the people became gradually discouraged with farming and concentrated on raising cattle, and especially sheep. Since the flocks and herds often had to be shifted long distances to bring them where the pasture was good in different seasons, these people learned to travel light. They learned some things about camp equipment from the older hunting tribes whose territories they were taking over, but they also kept many of the arts and crafts of their settled ancestors. They adjusted their old ways to a life of constant movement very much as we today adjust our familiar ways when we go on a camping trip. Objects were made light and unbreakable, the old village huts were exchanged for tents, and packing and moving were reduced to a science. It is important to remember, however, that this pattern of nomadic life was not primitive in the sense of being a holdover from earlier times. It was really village life simplified and made portable in very much the way that we have developed autotrailer living out of apartment living.

This shift from farming to nomadic herding must have had still other consequences. Sheep and cattle herded on unfenced land are the easiest of all valuables to steal since they can be simply driven away. In order to protect their own property these people had to become good fighters while cattle rustling meant quick wealth to those who could get away with it. Also, the settled farmers who lived along the edges of the grazing territory had many things which the herdsmen coveted. A raid on a farmers' village after harvest time meant a haul of grain which would add pleasant variety to the herders' usual diet of milk and meat. As a

result of all this the nomadic people became more warlike than their settled ancestors. However, it takes a good many square miles of land to support even one family on a herding basis. There were not enough of the herdsmen to do more than trouble the edges of the farming territory as long as farmers and herdsmen had the same military equipment and fought on equal terms.

It seems likely that the farmers and herdsmen would have stayed on equal terms, and that the whole history of Europe and Asia would have been different if it had not been for one important development. This was the domestication of horses. We still cannot say with any certainty just when or how this happened. Some of the Upper Paleolithic carvings of horses which have been found in Europe certainly look as though the animals were wearing bridles and it has been suggested that even long ago men may have caught young horses and raised them as pets. We know that the people of that time killed and ate plenty of wild horses and they may have used such pets as decoys. There is nothing to show that they ever rode them or used them to carry burdens. Perhaps the hunting people who were in the grasslands before the villagers arrived had such pet horses and the newcomers, who were already used to several sorts of domestic animals, including donkeys, took them over and put them to work. In any case, there were no horses in the region which the villagers came from and it took them a good while to find out how to use the new animals. Horses seem to have been driven before they were ridden and the earliest methods of harnessing of which we have record are obviously copied from the equipment used with oxen. Since oxen pull with their heads and horses with their shoulders, these early horse fittings were inefficient. They were gradually improved but it was not until the Middle Ages, when some genius in northern Europe invented the horse collar, that horses could be used for heavy hauling.

Actually, the horse was not needed for heavy hauling. There were already oxen available for that. The importance of the horse lay in the fact that it was and still is the only domestic animal which is of any real value in a battle. Elephants have been trained for war but these animated tanks are too unreliable. They are almost as likely to smash the ranks of their own army as that of the enemy since they are prone to stampede and make for any point where the line looks thinnest. Horses are not only large, strong, and fast but are the only animals which can be taught to trust a human to the point of going anywhere he guides them. They will rush head-on into a cloud of missiles or against a line of spears simply because their riders want them to and without waiting to figure out what the consequences are likely to be. Such behavior speaks considerably better for the horse's heart than for his head. It has made him man's second best friend and a heavy contributor to all military casualty lists.

The people of the grasslands, whether herdsmen or farmers, were quick to take advantage of the horse's characteristics and they used him in warfare from the first. His military career seems to have begun with the war chariot. The people of the grasslands discovered this bit of horse psychology early in the game and built up about it a whole series of new war techniques. At first they used the war chariot, a light, springless cart to which a pair of horses was hitched. The chariot crew usually consisted of two men, one to drive and one to fight. In pitched battles the chariots were driven into the thick of the enemy infantry until the infantry broke or the chariots bogged down. If the latter happened, they were still useful as fighting platforms. This system was effective enough against men on foot, especially if the footmen were unused to horses and afraid of them. It helped the restless villagers of the southern grasslands in their raids on the civilized peoples to the south until these people learned the same trick.

However, this first phase of horse warfare did little to change the balance between the herdsmen and villagers within the grasslands themselves. The early Chinese records tell us more than any others do about this period and they indicate that the villagers usually had the best of it. They could build more and better chariots than the nomads and support more men who were especially trained to handle them.

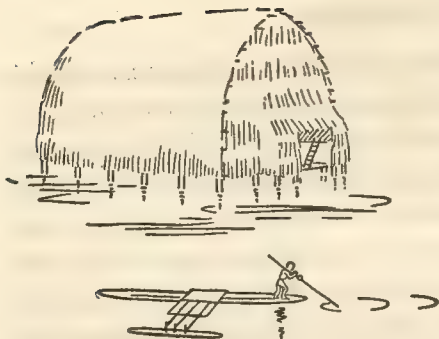
The war chariot was, after all, a clumsy contrivance useful only on open, level ground. The horse did not really come into his own until men learned how to ride him and how to fight from his back. This seems to have come surprisingly late in human history. It required not only practice but also a special sort of equipment. We do not know just when or where men first learned to ride, but the first rude cavalry seems to have appeared toward the eastern end of the grasslands among the herdsmen in the general region of Mongolia. The Mongolians invented the tree saddle, ancestor of our own stock saddles and army saddles. This gave the rider a firm seat so he could fight from horseback. They also invented or improved a special type of bow made from strips of wood and horn and backed with sinew. Such bows could be made short enough to be handled by men on horseback but at the same time strong enough to outrange longer bows carried by men on foot. In the hands of a skilled archer such bows were superior in accuracy and speed of fire to any other weapons in use prior to the development of the repeating rifle. Horsemen armed with them could avoid the clumsy rush of the war chariots and pick off their crews at leisure or ride round and round an infantry formation showering it with arrows until the survivors broke and fled. In later times the cavalry equipment was improved by the addition of long lances and by the invention of the stirrup, but the tree saddle and the composite bow were basic.

With the development of cavalry, the center of power in the

grasslands shifted from the farmers to the herdsmen. The herdsmen could now raid the farmers' settlements and make a quick getaway, and apparently they did raid them season after season until the farmers became discouraged. In the regions where good crops had always been doubtful, the farmers became herdsmen themselves. Village life was abandoned and areas which had once been cultivated reverted to pasture. In some places where good crops were fairly certain, as in the black earth region of southern Russia, the farmers stayed on the land but became vassals of the herdsmen. They accepted the rule of some nomad tribe and paid it tribute in grain and goods in return for protection from other nomads. Meanwhile the nomads perfected their fighting techniques and military organization and developed their ancestral arts and crafts still further. They have left no monuments except the mounds which they erected over the tombs of their chiefs, but the contents of these tombs show that they had extraordinary skill in all sorts of manufacture. In metalworking in particular they were quite as clever as the classical Greeks with whom they traded along the shores of the Black Sea.

These developments in the grasslands had far-reaching consequences for the civilized peoples of Europe and Asia. By the beginning of the Christian era the nomad dominance of the grasslands was practically complete. Although the population of the region was sparse by civilized standards, the region itself was so vast that any leader who could organize the tribes had a large force at his disposal. Moreover, the grasslands occupied a central position from which it was possible to strike out into all the long-established civilizations. China, India, the Near East, and Europe all felt the weight of the nomad attacks at one time or another. The daily life of the nomads was of a sort to keep them in hard physical condition and they learned to ride almost as soon as they learned to walk. In addition, their armies were superior to

those of most of the civilized peoples whom they encountered in equipment, in discipline and organization and, above all, in mobility. While their earlier raids were made for loot and were followed by withdrawals into the grasslands, their later invasions, such as those of the Mongols under Genghis Khan, laid the foundations for empires greater than any which the world had seen before. That western Europe never became a part of such an empire was not due to the courage and skill of its fighting men. The nomads defeated the European armies which they met with monotonous regularity. It was because western Europe was largely mountainous and heavily forested, bad country for cavalry, and because its people were too poor at this period to repay the trouble of conquering them.



Chapter 9

PEOPLE OF THE EASTERN OCEAN

At the time when men first appeared in southeastern Asia and began their wanderings, the big islands which now lie to the south of Asia (Java, Sumatra, Borneo, New Guinea, and others) were not islands at all. Part of them were joined to the mainland of Asia, while others were part of Australia. These two continents were so close together that it was possible for even Stone Age men, who had only crude rafts, to ferry across the brief expanse of open water. Those who ventured southward into what is now Australia were cut off from the rest of the world when the land bridges were broken and Australia became an isolated island continent. The men who had settled in Australia were a very primitive, early type, not very different in physical characteristics from the common ancestors of all men, and because they were so iso-

The drawing above shows an Admiralty Island house. In the Pacific Islands, house are merely platforms with thatched roofs to keep off rain and sun, a sort of family umbrella. The houses are often built on poles over lagoons because this makes it easier to keep them clean and defend them against enemies.

lated, this ancient type of man lingered on in Australia until the time that the first white men arrived, scarcely two hundred years ago.

During the many thousands of years that these people occupied the continent "down under," they did very little to change and improve their way of life. They had brought their dogs with them when they made the first crossing, but even the dogs remained wild. The Australians never made any attempt to domesticate the local animals, though perhaps they are not to be too much blamed for this, as the only large animals native to Australia are the various kinds of kangaroos. Since a kangaroo cannot be milked or used for a pack animal, the Australians never bothered to do anything with them except to hunt them for food. Perhaps if they had had cattle or sheep or horses, or any of the easily domesticated mammals, their history might have been different, but as it was they remained at a simple hunting and food-gathering level. They never raised crops or even discovered for themselves such simple things as how to weave or make pottery or use the bow. Their only technical invention was the boomerang, a flat, curved throwing stick which circles back to the thrower if it fails to hit the object at which it is aimed. Even this was probably an accidental discovery, since the makers never understood the principles involved and couldn't tell whether a newly made boomerang would work or not until after they had tried it.

The ingenuity of the Australians, such as it was, seems to have been devoted to social elaboration. They developed queer ceremonies which were believed to make the game more plentiful; they elaborated their marriage regulations and their genealogical records until these became the most complicated found anywhere in the world. The grown men all belonged to a sort of secret society from which women and children were rigidly excluded. When a boy was considered old enough to be initiated into this

society, he was put through a "hell week" compared to which the hazing which any American college boys have ever thought up would seem very mild indeed.

Australian society was ruled by the old men, who thought that what had been good enough for their ancestors was good enough for their children. Like all ultraconservatives, the Australians could survive only so long as they were isolated from competition with other groups. When the white men arrived, the natives were completely unable to make any sort of effective attempt at defending their lands. They had little organization and their own wars consisted largely of ceremonial get-togethers called *corroborees* in which the men of various tribes did a lot of yelling and threw long spears at each other, but it was seldom that anyone was killed and few participants were even wounded. When the white men took over the country, the natives retreated to the interior where many of them still live in the same primitive, hand-to-mouth fashion, while the white men build great cities, like Melbourne and Adelaide, along their coasts. The culture of the Australian aborigines was a backwater in the general stream of human history and contributed nothing to man's advance.

In southeastern Asia and the big islands which had once been part of it, history took a different course. These big islands, Java, Sumatra, Borneo, and the rest, are lumped together under a single name, Indonesia. The first populations of these islands came from southeastern Asia and were much like the Australians, but some time, long before the dawn of history, brown-skinned people of a more progressive turn of mind arrived at the island from over the sea and killed off the early inhabitants. These later people are called proto-Malays. Physically, they were much like the brown-skinned Caucasians who still live in parts of India. These people were among the first groups anywhere in the world

to build large seagoing ships and it is supposed that the proto-Malays sailed from the west to the islands.

Later, a brown-skinned people of a different sort, looking more like the people of South China, pushed into the region from the north. These later comers are called deuterio-Malays. In Indonesia the two groups met and mixed so thoroughly that it is impossible to tell what ideas and techniques each brought and what they may have borrowed from the earlier people whom they found already living in the region.

The Indonesian islands are rugged, with mountains coming down almost to the coast. This makes overland travel very difficult, but travel by sea is easy as there are many sheltered inlets along the coast and distances between islands are short. The brown people turned to the sea for their livelihood and became expert fishermen and sailors. The sea is a road to all the world and they followed it farther and farther until it led them westward as far as Madagascar, the great island off the east coast of Africa, and eastward to the far islands of the mid-Pacific and even to the western shores of South America.

Settled life in this region was built upon four main crops: yam and taro, which grow underground, and breadfruit and banana, which grow on trees. The people had brought pigs and chickens with them from the mainland, but both these animals were domesticated more for magical than for culinary purposes.

The people foretold the future by killing a pig and consulting its liver. The crowing of roosters was supposed to frighten away ghosts, which was an important item to these people because they believed that the spirits of their ancestors were very much around and taking a lively interest in everything. They were much afraid of these ghosts and the roosters contributed greatly to their peace of mind.

All chickens, a bird which is now found in practically every part of the world from the jungles to the frozen north, came originally from southeastern Asia, and the idea that they scared away ghosts has been carried along with them as they spread over all the farmyards of the earth. It crops up frequently in European folklore; for example, the famous old ballad, "The Wife of Usher's Well" in which the three drowned sons return at night to visit their mother but

"Up then crew the red, red cock,
And up and crew the gray;
The eldest to the youngest said,
' 'Tis time we were away.' "

The Indonesians never developed weaving techniques but they make a sort of cloth by beating out the inner bark of trees. The result is a tough, paperlike substance which makes perfectly satisfactory clothing for a tropical region. They did not make pottery either, but did their cooking in joints of bamboo or in earth ovens, which operated on much the same principal that campers use in making bean-hole beans. They knew of the bow and arrow but used it largely as a toy. For serious fighting and for hunting they preferred the blow gun, a sort of gigantic peashooter, sometimes as much as ten feet long, through which they blew light darts tipped with deadly poison.

The people lived in scattered villages, each of which was really one big family. People from neighboring villages might meet for trade but they did not mix socially and their young people never intermarried. There was frequent warfare between villages and much taking of heads, which were used in all sorts of ceremonies. A young man who had not taken his first head was not considered really come of age and found it hard to get a wife.

In each village was a large house in which the trophies of war

were kept and in which ceremonies were held in rainy weather, which was most of the time in this hot, damp climate. The house was also a sort of adolescent club house, for all the young men slept here together until they were married. Young people were allowed a great deal of fun and freedom in this culture, both boys and girls. They had no responsibilities and were expected to have lots of love affairs and amuse themselves as they saw fit. However, it was also expected that they get romance and frivolity out of their systems during this period, and when they married they were expected to settle down immediately. Any infidelity among married people, either men or women, was forbidden under heavy penalties.

The region in which this pattern of life was developed lay uncomfortably close to two of the great early civilizations, those of India and of China. The Indian influence was stronger and seems to have been earlier. By 400 A.D. there was an Indian settlement in Borneo; by 700 A.D. most of the region had accepted Indian religion and culture with minor modifications. At the eastern end of the region, in which is now Indo-China, the Chinese moved in and imposed much of their civilization upon the natives. By the time the white men arrived here, the old patterns of life lingered in only a few small out-of-the-way islands and among some of the mountain tribes on the mainland.

Although the old way of life died out in Indonesia, it left an important mark on human history. Even the proto-Malays were great voyagers and they carried their early culture to regions which neither the Indian or the Chinese civilization ever reached. It was a short step from Indonesia to the big islands which had once been a part of Australia: New Guinea, the Solomons, the New Hebrides. These islands are known today as Melanesia, "the black islands," because most of the people who live there are very dark skinned.

Voyagers from Indonesia pushed out into Melanesia, settled along the shores of the big islands. They intermarried with some of the local people and pushed others back into the interior, so that today we find Malay languages spoken along the coasts and languages of a very different sort spoken by the inland people. The Indonesians introduced the coast people to many aspects of their culture, their crops and domestic animals, but apparently the malaria, which was, and still is, very bad in these islands, was too much for the brown-skinned newcomers and they died out, leaving the islands in the hands of the black-skinned people who are more resistant to the disease. So today, the natives of Melanesia and Australia are black while most of the other Pacific peoples are brown.

The Melanesians modified the imported Indonesian culture in various ways, depending on the region and the sort of culture which was already there. The Melanesians also lived in small groups whose members married only among themselves. In the course of time each of these little groups worked out its own version of the mixed culture, with the result that, when the whites arrived, there was more variety here than in any other part of the world. Not only were no two islands alike in their way of life, but coast people on a single island were different from the interior people. Settlements within a few miles of each other might have quite different languages and cultures. To meet this situation the white traders and administrators evolved a language called "pidgin English," a polyglot tongue composed of English words mispronounced and strung together in native fashion. For example, "I am hungry" would be "belly belong me feller 'e sing out." Some words come from the French, as in "me no savvy" for "I don't know." This language is used throughout the region in most dealings between whites (whether French, German, Dutch,

or English) and natives, and is also used between natives who can't speak each other's languages.

These intertribal differences persisted in spite of the fact that tribes in a particular region or island group had often worked out very complicated trade relations and depended on each other for necessities. Thus in some places a single tribe would make all the pottery used over a wide area, or an interior tribe would make all the fish nets used by tribes along the coast. More curious still, one of the tribes of the Admiralty Islands made all the weapons for several of the islands, although these weapons were often used by the purchasers against the makers. Every tribe was normally at war with at least one of its neighbors, and trade was carried on through a third tribe, or at neutral market places where the women did the trading while the armed men stood at a distance and glowered at one another.

In spite of the diversity of culture, certain things were common to most of the Melanesians. They were fairly good farmers, with yams as the staple crop in most places. They were also good craftsmen, especially in working wood, and many of them had developed the art of wood carving to a high point. Masks and figures from this region often make one think of the work of the modern surrealists. The Melanesians had complicated marriage regulations, a little reminiscent of those of Australia. Most tribes had no real chiefs, power being in the hands of the older men, especially the wealthy ones. Wealth was important everywhere. A man could acquire social prestige by displaying his wealth in the giving of elaborate feasts and ceremonies.

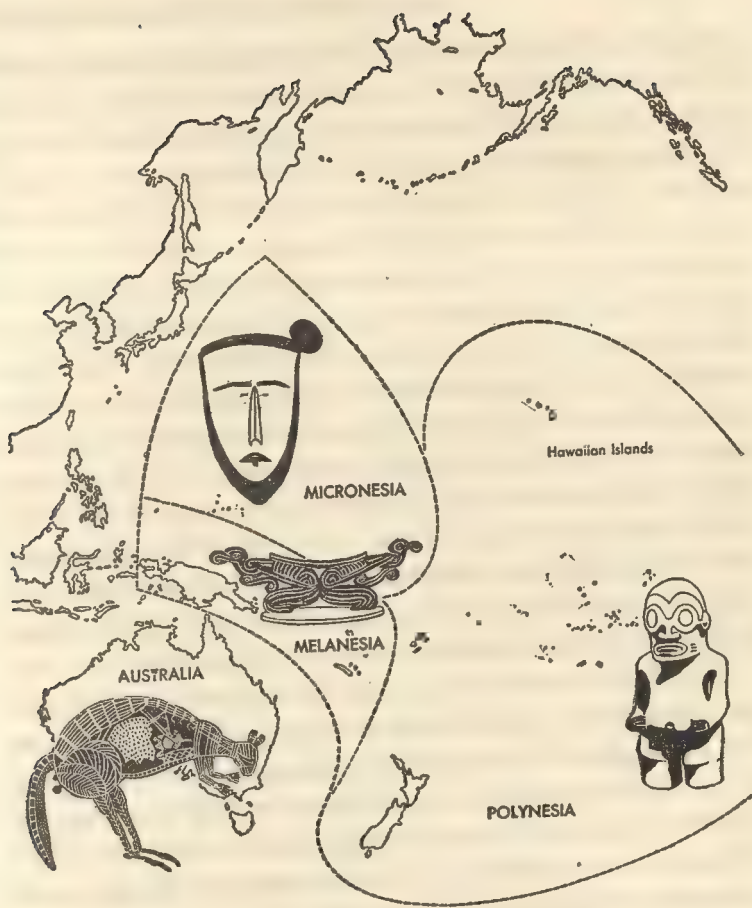
The Indonesian idea of a men's house was combined with the Australian idea of all men forming a sort of secret society. In many tribes all the men were organized into a society which had grades, much like the degrees of Masonry. A boy joined the low-

est grade when he was initiated into manhood and then bought his way from grade to grade, rising as high as his means would allow. Only four or five men in a village could attain the highest degree and these aristocrats ruled the village.

Every man knew and practiced some magic. The way to get from a lower grade to a higher one was to purchase knowledge of more potent magic. Most Melanesians seem to have been jealous, competitive people who thought that they could get ahead only at the expense of others, and they used their magic not only to increase their own wealth but to hold others back. Head-hunting and cannibalism were common in most of the region and, all in all, the Melanesians seem to have been about as unpleasant as their climate. Their territory was one of the last parts of the world which was brought under European control, and even today the interiors of many of the large islands have never been explored. Until troops were sent to these islands in the late war, few whites except an occasional missionary or trader had even been there.

Melanesia was probably the first region to be visited by the early Indonesian explorers, but as they gained greater skill in sailing and learned how to build better ships, they pressed farther and farther out into the Pacific. Presently they passed beyond the limits of the ancient southern continent and came to islands where no human beings had been before. Some of these islands were atolls which had been built up from the floor of the sea by millions of tiny coral animals; others had been pushed up from the depths by volcanic action, but all of them were new land. The atolls were not good for farming and life on them was hard, but the volcanic islands had rich soil. Both had good climates with no fever. Here the Indonesian explorers made themselves at home and became the ancestors of the modern Polynesians and Micronesians.

Most of these islands were mere specks on the map, tiny frag-



THE EASTERN OCEAN

The islands of the Pacific are divided into three areas: Polynesia and Micronesia, occupied by brown people who came originally from Asia, and Melanesia, inhabited by black people who resemble the Australians. The drawings on the map show art objects characteristic of each region: an ancestor image from Polynesia; a mask used as a house ornament in Micronesia; a carved neck rest with frigate bird design from Melanesia; and a kangaroo painting used in Australian magical rites.

ments of land lost in the wastes of the Pacific. One wonders how the first settlers were able to find them at all. However, the Pacific was the perfect school for seamanship. The distance between the islands gradually lengthened as the voyagers went eastward, but there were no sudden breaks and, until the mid-Pacific was passed, the chances of eastward voyagers hitting at least an atoll were excellent. Also the weather was good most of the year and the trade winds blew steadily from the east, so that explorers who failed to make a landfall could come home much faster than they went out. By the time the white men arrived, the Polynesians had explored most of the Pacific. They had learned to build great canoes which could carry enough provisions for a voyage of more than a thousand miles. These canoes were made with two hulls which were fastened side by side and the space between decked over. They were fitted with masts and lateen sails and were actually faster and better for beating up against the wind than most European ships built before the American Revolution.

The Polynesians had also studied the stars and worked out a real science of navigation, which made it possible for them to locate the islands which they found and to go back to them unerringly. This knowledge was handed down by word of mouth, but was kept almost as accurately as though it had been written. The Polynesians never developed a written language. Young chiefs gathered a crew of comrades and sailed away in search of adventure and new lands. A defeated tribe was frequently given time by their conquerors to build canoes and leave the island in a body, sailing away in search of a new home with drums beating and flags flying. On such expeditions, the domestic plants and animals, which were needed to found a new colony, were carried along. In this way the pig and the chicken and the old Indonesian crops were spread over most of the Pacific.

The Polynesian Islands form a great crescent in the mid-

Pacific, with Hawaii on the north and New Zealand on the south, Tonga on the west and Easter to the east. Included in this group are also the Marquesas Islands, the Tuamotus, the Australs, the Cook and Society Islands, and other scattered small islands.

The Polynesian voyagers undoubtedly reached the coasts of both North and South America, long before any Europeans reached these shores. There are some indications that they may even have made return trips, carrying American food plants back to their islands. However, they left little mark on the New World because they arrived too late. By the time their canoes reached the Americas, the Indians were already well established and had developed cultures richer and more advanced than those of the Polynesians.

The most easterly point in the Pacific at which the Polynesians established a colony was at Easter Island, a tiny spot of barren land in the wastes of the Pacific, about twelve hundred miles from any other inhabited Polynesian island and about two thousand miles from the coast of South America. Ever since this island was discovered by the whites there has been much speculation about it. There was a theory that it was part of a lost continent which had sunk into the ocean. The island had many strange features unlike any other Pacific Islands. On the slopes of the extinct volcano brooded great stone figures, some of which weighed up to thirty tons. There were wooden tablets engraved with a strange script, which was related to no known writing, and which have never been fully deciphered. The Easter Islanders were the only Polynesians who worked out any sort of written records.

Much of Easter Island's history is lost forever, for in 1862 Peruvian slavers raided the island and carried off the king and all his nobles. Since the folklore and knowledge was vested in the

nobles, here as in other Polynesian cultures, the commoners who fled the raiders were unable to read the tablets or to describe their history. However, we do know that Easter Island is no lost continent but just another island discovered by the venturesome sailors of the Pacific. Easter Island is so far from any other land-fall that the crew must have been weary and supplies depleted when they sighted these rocky shores, so that they were glad to settle down. Once they had settled, however, they were stuck there, for there are no trees on Easter Island large enough to provide lumber for a seagoing boat. Therefore the islanders, cut off from their own people by over a thousand miles of open sea, developed a culture which was distinct from that of other Polynesian groups.

Even the best of the Polynesian Islands were comparatively poor in natural resources, but the Polynesians showed amazing skill in utilizing what they had. All the most important crafts were in the hands of professionals who maintained craftsmanship of a high order. Although they had only tools of stone, bone, or shell, many of the objects they made could hardly be bettered by modern Europeans with steel implements. In art they had an unusual feeling for both form and design and the products are anything but "primitive." They also regarded living as a fine art and there have been few places in the world where courtesy and consideration for others, if those others were members of one's own tribe, were carried further. Toward their enemies, however, they were very cruel, frequently torturing and eating their victims.

Every tribe had its own chief, but he was merely the man who traced his descent in the most direct line from the tribe's founder. In some of the islands certain tribes had conquered others and established their chiefs as paramount chiefs, kings of kings. Such a paramount chief had unlimited authority over the conquered groups, but the blood ties were always strong. Chiefs and nobles

kept their genealogies with as much care as any European royal family, and a chief whose ancestors had left some island twenty generations before could return, claim kinship, and be received and even given a share of his ancestor's land.

Religion was regarded as a technique for dealing with the gods and ancestral spirits and, like all important crafts, was delegated to specialists. In many of the islands there were great temple establishments with retinues of priests, temple lands, and dignified and elaborate rituals.

Adolescents in Polynesia enjoyed the same freedom as the young people in the old Indonesian culture. They weren't expected to work, and boys and girls played together and had many love affairs before choosing their permanent mates. In the Marquesas Islands the adolescents of each village were organized into gangs. These groups of teen-age boys and girls were the village entertainers. They put on plays and dances for all ceremonies and feasts. They not only performed for their own village but toured around the neighboring villages as well. When a tribe which was usually hostile wanted to import an unusually talented group of youngsters from an enemy tribe for a special ceremony, they would declare a truce and invite the young entertainers over to give a performance at the feast. The troupe would be royally entertained, but when the festivities were ended the tribes would be at war once again. Here, as in Indonesia, all teen-age fun and freedom were supposed to be put aside as soon as the young people married.

The whole pattern of Polynesian life was one of refinement and sophistication and Europeans have found the Polynesians more congenial than any other uncivilized people. They are a gifted and handsome group. The tales of beautiful maidens in sarongs, carefree brown people disporting themselves in the surf and diving for pearls have been inspired by the Polynesians.

Many of our soldiers who were sent to the Pacific expected to find this sort of idyllic native life in the islands where they were stationed and were profoundly disappointed with the steaming jungles and ill-favored people of the Melanesian Islands.

Even the British, when they first settled in New Zealand, allowed the native Maoris a degree of social equality which they had never accorded to any other dark-skinned race. On the other hand, the Polynesians were eager to learn new things and admired the accomplishments of the white men. They received the Europeans willingly and, in most places, accepted Christianity with enthusiasm. Unfortunately, the Europeans brought with them a whole series of diseases to which the isolated islanders had never been exposed and to which they had no resistance. They were ravaged by epidemics of measles and influenza, which were as deadly for them as the Black Death in Europe. It seemed for a time that the Polynesians would be wiped out, but the survivors acquired a certain degree of immunity to the introduced diseases, and the native populations of most of the Polynesian Islands are now on the increase. It is expected that this gifted race will make real contributions to civilization in the years to come.



Chapter 10

DESERT AND JUNGLE

Africa was given the name of the Dark Continent in the days when only its coasts were known to the civilized world and the interior was a dark and mysterious jungle in which exploring expeditions were likely simply to disappear. The last hundred years have seen the African continent pretty thoroughly explored, but most of its history is still dark. Even today there are areas as large as the whole United States in which no systematic archeological work has been done and for which we have no written history before the time when Europeans came. It follows that when we try to reconstruct Africa's past we have to work from the hints given by a few widely scattered finds of early remains and by modern conditions. We stand on much less firm ground than we do when we reconstruct the past of Europe, Asia, or even the two Americas.

The Africans were expert craftsmen in all sorts of materials. Their art has had a strong influence on our own "modern" sculpture. The pottery vase shown above, from the Congo, was made for use in a marriage ceremony. It is in the collection of the American Museum of Natural History.

We know that the whole of Africa has been occupied by human beings since very early times, in fact the continent may very well have been reached by the half-men who were the ancestors of our species. Africa is tied to southwestern Asia at the Isthmus of Suez and lies very close to Asia along the whole length of the Red Sea. This region where the two continents meet is all desert today. However, when the ice still covered northern Europe and Asia, it was open grassland, fairly well watered and with plenty of game. This condition lasted long after man arrived and we find the remains of Old Stone Age settlements in places where, as the saying goes, a crow would now have to carry his rations if he flew over. In those days the region which later became the Sahara Desert was also well watered, so that there was no bar to man spreading southward until he reached the Cape of Good Hope.

When the ice retreated northward at the end of the glacial period, Africa and the adjoining part of Asia began to dry up. By the time civilization got under way in Asia, only six or seven thousand years ago, the climatic conditions in Africa were not very different from those which exist today, although the desert areas were not quite so dry or so large as they are now. Northern Africa east of Suez was mostly desert except for the Abyssinian plateau, which was well watered, with a temperate climate. Just west of Suez lay the fertile valley of the Nile, a thousand-mile-long oasis with desert on both sides. Along the southern shores of the Mediterranean there stretched a narrow strip of land where the rainfall was barely heavy enough for grain growing. Below this the Sahara Desert extended from the Nile valley to the Atlantic, an effective barrier to settlement or to any large-scale movements of population north and south.

From Abyssinia and the upper Nile valley southward to the Cape of Good Hope there ran a great plateau most of which was grassland with scattered clumps of trees in the moister regions.

Great herds of game roamed this region and most of the modern moving pictures of big game hunting in Africa have been taken here. A narrow strip of similar grassland ran westward from this plateau along the southern edge of the Sahara clear to the Atlantic. In all this open country the rainfall was light and most of the rain came down during a short rainy season so that the land was parched for several months in the year. Along the southern coast of the great western bulge of Africa and from there inland to about the middle of the continent, there was a region of heavy rainfall and intense heat. This territory was covered with dense tropical forest. In the far southwestern part of Africa there was more desert again, but this is of interest to us mainly because a very ancient African race and culture were able to survive in this undesirable region until modern times.

We usually think of all Africans as Negroes, but this is not correct. In the earliest times of which we have record, northeastern Africa was occupied by a race which had black skins, like the Negroes, but European features and curious bushy hair unlike that of either Negroes or whites. Egypt and the southern shores of the Mediterranean were occupied by brunette white people very much like the modern Spaniards and southern Italians. The great East African plateau seems to have been occupied by the ancestors of the present Bushmen and Hottentots. These people are a puzzle to the anthropologist. They are a dwarfish, yellow-skinned race with slant eyes but with broad noses, thick lips, and kinky hair. When food is plentiful their women grow great bustles of fat which serve as a food reserve in famine times, like a camel's hump. The belt of grasslands south of the Sahara seems to have been occupied by true Negroes from the earliest times, but the dense forests farther south were held by Pygmies. These Pygmies were real dwarfs, even the largest men rarely growing five feet tall, and were very black with flat noses, thick lips, and

kinky hair. Only the Pygmies and the people just south of the Sahara could be classed as Negroes.

In spite of these differences in race, all the people who occupied the African grasslands at the end of the glacial period seem to have been very much alike in culture. At that time the Sahara was still fairly well watered so that the grasslands stretched clear to the Mediterranean. The African grassland people, like their European contemporaries, were excellent artists and have left us spirited drawings of the big game which they hunted, and also of themselves. They seem to have learned to use the bow even before the Europeans did and they were expert workers in bone and stone. In stone work they specialized in small arrowheads with a straight cutting edge, like a chisel, and in scrapers so small that one wonders what they could have been used for.

This ancient culture survived in the Kalahari Desert, in far southwestern Africa, until after the Europeans came. The Bushmen who lived there kept to the ancient patterns of life with surprisingly little change. They still painted excellent pictures on the walls of their caves and still made stone implements of the ancient forms, although after the Europeans came they often made them from broken bottles. The Bushmen lived entirely by hunting and food gathering and were constantly on the move. Food was so scarce that each family roamed by itself, although various families had friendly connections and got together from time to time. Men did the hunting and women the root digging. The men's bows were small and weak, but they made up for this by tipping their arrows with a particularly deadly poison which was strong enough to kill even elephants. Since the Bushmen hunted the cattle of their more advanced neighbors, their neighbors hunted them and the white men soon took up the practice. A few of them survive even today, but we have been able to find

out very little about their way of life. We do not even know why they painted their pictures of animals and men.

The Pygmies, who occupied the forests at the time that the Bushmen's ancestors held most of the eastern grasslands, are mentioned in very early records. Several of the ancient Egyptian Pharaohs kept such Pygmies as pets, buying them from the big Negroes who even then held the Upper Nile. Some of these Pygmies still survive in the depths of the great tropical forests, but they seem to have lost most of their ancient culture. The modern Pygmies live partly by hunting with poisoned arrows but mainly by sponging on the big Negroes who have now moved into the forest region. Each band of Pygmies is attached to a Negro village. The Pygmies serve as scouts in war and give warning of attacks and in return the villagers give them food and castoffs.

Since southwestern Asia was the region in which food raising and settled life first arose, it is not surprising that these improvements spread to the parts of Africa which were nearest Asia within a few centuries after they had been made. In fact they reached northeastern Africa some time before they reached Europe. Egypt became the seat of one of the earliest of the great civilizations, but its ties were with Asia rather than with Africa to the south. Although the Egyptians developed a whole set of distinctive ideas, from hieroglyphic writing to mummies and pyramids, the domestic plants and animals which made their civilization possible were all of Asiatic origin. From Egypt patterns of farming and settled life spread westward along the southern shores of the Mediterranean until they reached the Atlantic, but no new civilizations sprang up there. There were no rich river valleys and, except in a very few places, the rainfall was too light to support a large population.

That civilization did not go on spreading into the rest of Africa

after this promising start seems to have been due mainly to a belt of almost continuous desert extending across Africa from the Indian Ocean to the Atlantic. Throughout the whole of recorded history this desert belt, rather than the line of the Red Sea and the Mediterranean, has been the dividing line between darkest Africa and the civilized world.

The part of northern Africa which forms the southern shores of the Mediterranean Sea shared in the development of the great civilizations of southwestern Asia and southern Europe. Settled life was therefore much earlier there than in other parts of Africa. The Egyptians sailed along these coasts and established settlements; later came the Cretans and then the Phoenicians, who established their great city of Carthage on the northern shores of Africa. Carthage was the great rival of Rome for more than a hundred years but finally fell to the Roman conquerors in 146 B.C. The Greeks and the Romans also built cities along the African coasts, the ruins of which show us how closely this region was tied to Europe in classical times. It was not until the Arab conquests of the eighth century that these close bonds were broken and the civilization of North Africa became more Arabian than European.

East of Suez in the fertile Abyssinian highlands village life was established as early as it was along the Mediterranean coast. A great inland empire grew up here and, long before the beginning of the Christian era, the Abyssinians were fighting and trading with the Arabs on the other side of the Red Sea. The Queen of Sheba, who made the famous visit to King Solomon, was an Abyssinian monarch and the kings of Abyssinia still trace their line from Menelik, son of Sheba and Solomon. The Abyssinians were Christianized very early by Coptic missionaries from Egypt. This gave rise of the legends of the great bishop Prestor John, who ruled in great splendor in the heart of Africa. However, in

spite of its Christian background, Abyssinia has always been much closer to Arabia than to any of the Christian civilizations of the west.

South of the desert belt the land was too poor to support the sort of village life which arose in North Africa. The African grasslands were too hot and too dry for grain raising, while the tropical forest region was too hot and too wet. The grasslands provided pasture, but cattle could not be kept in the forest region because of various insect-carried diseases. There is a common belief that the Negro lagged behind other races in the development of civilization because he lacked intelligence. Actually, the main reason for his lag was that he had no crops on which civilization could be built. When crops which were suited to the African conditions were introduced from Asia and America, the Negro went ahead rapidly, but their introduction came so late that he was not able to catch up with the rest of the world before the Europeans conquered him.

There was always some trading back and forth across the desert, and cattle and sheep were introduced into the southern grasslands in fairly early times. Oddly enough in this region, where the men had woolly hair, the sheep had long straight hair, somewhat like that of an Irish setter, and long tails ending in a football sized lump of fat. The grassland people learned to milk both cattle and sheep and developed a method of life which was based on dairy farming eked out at first by hunting and gathering wild plants. Later, when they got crops that would grow in that region, the women raised small garden plots.

The people lived in little settlements, widely scattered so that there would be enough pasture for the animals, and moved only when they had to find new pastures for the herds. Each village was a circle of dome-shaped huts with a cattle pen in the center, from which the herds were driven out to graze in the morning,



ZULU KRAAL

The natives of South Africa lived mainly by dairy farming. Villages were small and widely scattered so that there would be enough pasture land around each of them. Houses were made of sticks and thatch, and the whole village was surrounded by a high, tight fence to keep out wild animals.

and driven back at night. This was the men's work. They had to guard the cattle during the day, fighting off wild animals and enemy raiders.

These people were very devoted to their cattle and regarded them almost as people. All sorts of beliefs and ceremonies developed around them. In some tribes, elaborate genealogies were kept for the cattle. A gift of cattle was an important part of the bride price which was paid to the bride's family and the genealogies of such cattle were carefully kept. If a man discovered that the cattle which were in the dowry of his prospective bride were related to those which had been part of his own mother's bride price, the wedding was automatically called off.

There was much fighting and cattle raiding among the men of the various tribes and since many men were killed while the women stayed safe in the settlements, there were more women than men in the tribes. Most primitive people do not tolerate old maids, and women always get married. The result of this was that the men who survived usually had many wives. Often a whole village would be occupied by a man, his wives and sons, and their wives. Tribes were ruled by strong chiefs who led in war and administered justice according to regular codes of law which were handed down by word of mouth. All the men of a tribe were divided into age groups made up from the various groups of boys who had been initiated into manhood at the same time. In war, these age groups fought together as regiments and in many tribes the members of such a group were not allowed to marry until they had distinguished themselves in battle. Most of the cattle-keeping tribes were warlike and, in later times, able chiefs often built up extensive empires which usually fell to pieces at their deaths.

While this method of life was developing in the grasslands, the forest lands remained backward. Their chance came later,

when certain crops which were suited to damp tropical conditions reached Africa from Asia. In the chapter on the *People of the Eastern Ocean* we have described how the Indonesians set out on long voyages of exploration taking with them everything which was needed to found new colonies. These people sailed westward as well as eastward. In Madagascar, the great island which lies close to the east coast of Africa, they were able to establish themselves so strongly that their language, race, and much of their way of life still survive there. Apparently many of these voyagers also reached the east coast of Africa north of Madagascar, but this region was inhospitable and poorly suited to permanent settlements. Most of the region was too dry for their crops to do well and malaria was bad. If they did found colonies here, these had disappeared by the time the Europeans arrived. Nevertheless, they introduced two new food plants, the yam and the banana, which spread inland until they reached the forest region. Here these plants found a climate well suited to them and became the staff of life in great areas, opening up the tropical forests to settlement.

There is reason to believe that some of the later Indonesian visitors were also responsible for teaching the Africans how to smelt and work iron. While Africa north of the desert belt went through the same development from stone to bronze to iron which took place in Asia and Europe, Africa south of the desert passed directly from stone to iron. Of course the same thing happened in various other parts of the world when the European traders came and sold iron tools to stone-age people such as our own Indians, but the Africans developed their own methods of working iron long before the Europeans came. However, the African ironworking does tie in closely with the sort which was done in India and the Indonesian islands, and since we know that Indonesians reached Africa, the chances of its being intro-

duced from there seem excellent. A curious feature of African ironworking is that throughout most of the continent blacksmiths are a separate caste, sometimes honored and sometimes despised, but never treated the same as other people. This is the sort of thing that might arise when a group of foreigners introduced a new craft, while keeping its secrets to themselves.

Iron tools made the clearing of the jungle lands not too difficult and the new tropical crops made agriculture possible in the regions of heavy rainfall. As a result, the Negroes moved into the forest region, pushing back the scanty Pygmy population. The only domestic animals which could be kept in this region were goats, phenomenally tough and adaptable beasts, dogs and chickens. Even these could not be raised in large numbers, so the forest settlements had to rely on hunting for most of their meat. The soil was not too good and so many weeds sprang up in the clearings that fields could not be used profitably for more than three or four years. After that it was simpler to clear new land and allow the old clearings to go back into jungle. The people in this region lived in villages considerably larger than those of the cattle people, but because of their need for plenty of land for hunting and new clearings, these villages had to be widely scattered. Travel through the jungle was difficult, so the villages were built on the banks of rivers when possible. Each village was ruled by its chiefs, who had absolute power in theory but who actually governed according to long-established custom and a generally known code of laws. In a few cases some one tribe was able to establish its rule over two or three others, but closely knit kingdoms were rare. Widespread, short-lived empires of the sort common among the cattle people never developed in the forest region.

Perhaps the gloomy and threatening forests had an effect on the people who lived in them, for witchcraft and magic were rampant in this region. The medicine men had almost as much power

as the chiefs. Although the forest people recognized many gods and worshiped the spirits of their ancestors in not very elaborate fashion, most of their dealings with the supernatural were by way of fetishes. These fetishes were the result of ideas quite foreign to civilized thinking. They were not idols, in the sense of being images of gods through which the gods could be appealed to, neither were they the dwelling places of spirits. They were made by combining certain things, such as the wood of a particular tree, the blood of some animal, earth from a certain place, and so forth, in a particular way. After they had been made, however, they had a life and intelligence of their own. They required sacrifices and had power to help or injure even those who had made them. Perhaps the nearest equivalent to a fetish in our own thinking would be a substance like gunpowder, a combination of harmless materials which, when put together, becomes something with great power for destruction.

In far western Africa the development of native life followed a somewhat different course from that which it took in any of the regions we have described. The western Sahara was not as difficult desert country as the eastern part and there was traffic across it from the northern to the southern coasts from very ancient times. This is the only region where we find traces of New Stone Age settlements much like those of North Africa south of the desert belt. Caravan routes were established in prehistoric times and have continued in use down to the present. By way of these routes, first some Phoenician and Roman, and later much stronger Arab influences reached the southern coast.

At a time when Europe was in the Dark Ages there were already great kingdoms here. The great city of Timbuktu, which most Americans have heard about only in limericks, was for centuries the capital of an empire larger and richer than any in Europe, and at a time when few of our own ancestors could write

their names, it had a university to which students came from all over the civilized world to study law.

Timbuktu lay at the southern edge of the desert, where caravan routes converged, and its way of life was more Arab than Negro. However, along the coast there were Negro kingdoms which also had a civilization of a high order. These kingdoms are of special interest to us, for the ancestors of most of the American Negroes came from them. Several of them were still flourishing when the Europeans arrived. They were rich and populous, with arts and crafts little inferior to those of Europe. In metalworking, leatherworking, and wood carving they had achieved a skill which challenges the admiration of our own artists. Some of the bronze castings from this region rank among the greatest artistic productions of all times.

However, the great genius of these people seems to have lain in organization. The various crafts were practiced by hereditary groups under government supervision and there was an extensive system of markets, also under strict government control. Regular censuses were taken and tax collecting was reduced to a fine art. Professional armies were maintained and attacks on neighboring kingdoms were preceded by propaganda campaigns carried out by very modern methods. The people were always made to believe that the other kingdom was attacking them. There were a horde of officials of different ranks and degrees of authority, each responsible to the man above, and the whole governmental pyramid was topped by an hereditary king whose power over the persons and property of his subjects was absolute.

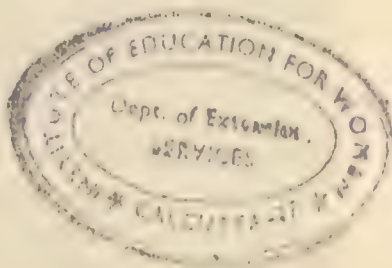
For some curious reason these people never adopted writing, and in order to keep track of this elaborate governmental system they developed various ingenious methods. Thus in the Kingdom of Dahomey the census records were kept with sacks of pebbles, one pebble for each person, the census sacks for many years back

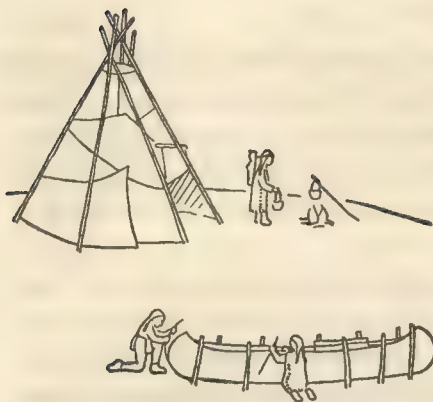
being kept in a special house where they could be referred to at need. In the same kingdom the king had several thousand wives and each official had one of these wives assigned to him as "sister." She was expected to be present whenever the official held court, to make reports or confer with other officials, and to remember what happened so she could report it to the king when needed. The royal court was a huge establishment, with innumerable officials and an etiquette even more complicated than that of most European courts. It is an indication of the high position of women in this civilization that the queen, who was the king's sister, not his wife, had her own court which paralleled that of the king office by office, but with all the posts filled by women.

Religion was as highly organized as government. There were numerous gods each of which presided over some force of nature or some activity. Each god had his own temples and professional priests, often subsidized by the government. People usually chose a particular god for their devotion, praying to other gods only when they needed help of a special sort. In addition, all the gods were prayed and sacrificed to for the well-being of the state. The spirits of the royal ancestors were the special guardians of the kingdom and in many places they were notified once a year of the state of the nation. Reports and requests were forwarded to them by the simple process of giving the message to some victim, usually a criminal, who was then killed with appropriate ritual. These human sacrifices shocked Europeans but the total number of victims used for them was smaller than the number of those killed in many of the European religious persecutions. One of the outstanding features of this area was the development of secret societies which blended religious and political functions. The members of such a society worshiped a particular god and gave ceremonies in his honor at which they appeared masked.

They also punished offences against society members or against good conduct in general in very much the fashion of a Ku Klux Klan. One of their main functions was to keep rebellious wives in order, but in many places the women had similar secret societies and had developed techniques for dealing with troublesome husbands.

This part of Africa is unsuited for European settlement and even today the only whites who try to live there are government officials, traders, and missionaries. In many places the Europeans have found it more profitable to rule indirectly through the native chiefs so that much of the old political organization has been kept in working order. Many students from this region have come to Europe and America but it seems unlikely that the West Africans will accept European civilization as a whole. They are more likely to take over those parts of it which are useful to them and blend them into their own civilization. In the new world which is now taking shape the West Africans may well be a force to be reckoned with.





Chapter II

NEW WORLD

America was called the New World because it was new to the Europeans who compiled the first geographies, but the name fitted better than they knew. America was also new to man for it was the last big land to be occupied by men in their world wandering. From the evidence we now have, it appears probable that man reached this continent not much more than twenty thousand years ago. This may seem like a considerable stretch of time, but it is a very small part of the time which has elapsed since man appeared on earth.

The most important discovery in American prehistory was made in 1925 by a colored cowboy in New Mexico. He was riding along the bottom of a deeply cut ravine on his way back to the ranch where he worked when he noticed that there were oddly shaped bones sticking out of the washed-out bank of the gully. Remembering that his boss, the owner of the ranch, was interested in such things, he got off his horse and pulled some of

the bones out of the bank. The rancher realized that they were fossil bones of some extinct species of animal and wrote to the American Museum of Natural History about the find. The museum promptly sent scientists out to excavate the site and found that the skeletons were those of a small herd of bison of an extinct species. But most interesting was the fact that among the bones, undoubtedly embedded in the flesh of the animals at the time they had been left there, were stone spear points of a sort which were not made by any Indians of the historic period. Many of the skeletons were complete, except that the tail bones were missing in all of them. Apparently the ancient bison had been surrounded and speared, then the hunters had skinned the carcasses and carried off the hides with the tails attached. This discovery proved beyond question that men were living in North America at the same time as the mastodon, mammoth, giant sloth, and other huge beasts and that he hunted these animals.

The settlement of America was late and came slowly because even twenty thousand years ago no people had the equipment necessary to cross the great oceans which lay on either side of this continent. The only way men from the old world could reach this continent was across the Bering Strait. There are islands in the middle of the Strait from which one can see both the coast of Siberia and Alaska on a clear day and in the winter it is simple to cross over on the ice. In fact, only thirty years ago many of the natives on the Asiatic side used to move to America once a year when the Russian tax collectors came around, and move back when they left.

The first migrations probably took place in the Ice Age, but northeastern Asia was free of ice at this time and so was most of Alaska, although there was a great ice field covering the mountains in the northwestern part of the continent, and another great field covering much of eastern Canada and northeastern United

States. Between the ice fields there seems to have been a corridor of ice-free land running from Alaska out to the Great Plains. The newcomers drifted southward by way of this corridor until they reached open country below the eastern ice sheet. There in a land with plenty of game and no human enemies, they spread and multiplied rapidly. We know that under favorable conditions a population can double itself every twenty-five years and once the settlement of the continent had started, it undoubtedly went on apace.

As time passed and the ice retreated still farther north, immigration from Asia became increasingly easy. The settlement of America was not a single migration but a continuous movement which went on for thousands of years. The country around Bering Strait was always too poor to support many people, but small groups kept coming across and working their way southward. The next to last migrants were the ancestors of the Athapascan Indians who now live in Alaska and northwestern Canada. These tribes still speak languages which are remotely related to the Chinese. The last migrants were the Eskimo, who still hold the shores of Bering Strait and who probably arrived only a couple of thousand years ago.

Although the contact between Asia and America was thus never broken and nearly all the basic features of the culture of the northern forest and tundra people of Eurasia were carried to America in this way, the link between the two continents was so far to the north that the advances which were made in Asia south of the forest belt never reached America. Thus none of the Old World crops and only two of its domestic animals, the dog and the reindeer, could live under arctic conditions. This meant that the American Indians had to solve the problems of food raising and settled life for themselves, finding uses for the plants and animals which they found in the New World. At the time that the

Europeans arrived on this continent, the Indians were at the point in development of civilization which the people of south-western Asia had reached in 4000 B.C. and the people of western Europe in 1500 B.C. That the Indians had been able to come this far without outside help proves they were a gifted race and if left to themselves they would have developed civilizations as high as any in the Old World.

The first settlers of America must have been nomadic hunters and fishermen, since no other method of life would have been possible in the arctic regions they had to traverse. They certainly knew how to use fire, how to make tools of wood, stone, and bone, and how to twist cord and weave some sort of crude baskets, and to do a host of other things which were already old in human history. In view of the arctic temperatures, it is also safe to say they had learned how to make clothing from animal skins and how to build some sort of warm shelter for the winter. They do not seem to have known the bow and arrow, since their descendants of several thousand years later still lacked it, and for the same reason, it is doubtful that they had any domestic animals, even the dog.

When these first immigrants found their way past the great ice sheets and began to spread out over the region which is now the United States, different groups wandered into different parts of the country and encountered very different environments. Those who wandered to the great plains found a land swarming with game and they became big game hunters and developed for themselves the special techniques necessary for this form of life. They became very expert in the chipping of knives and spearheads. The spear points found with the prehistoric bison in the New Mexican gully were the work of these people, as were most of the implements which have been found with the bones of extinct animals in America.

West of the plains, in the great plateau which runs north and south in the heart of the Rocky Mountains, big game was scarce. However, there was plenty of wild vegetable food, particularly seeds of various sorts. The people who settled in this region learned to weave tight baskets, so their descendants have been called the Basket Makers. In these baskets they gathered and stored the seeds, and they also developed the method of toasting and grinding the seeds to make meal which could be used for many things. Since they had little use for spears and knives, they made few of them and those they did make were of a crude sort, but many of their seed-grinding tools have been found. Now and then a weapon of the sort made by the big game hunters will be found in one of these camp sites, showing that the hunters and the Basket Makers occupied this country at the same period, each in his own region and that there was some contact and even trading back and forth. A Basket Maker may have traded a batch of seed cakes for a spear point.

Toward the east the plains gradually gave way to great forests which covered the land shores of the Atlantic to the Gulf of Mexico. There was less game in the forests than on the plains and few seeds to gather. However, there was an abundance of acorns, nuts, and roots, and the rivers were full of fish and mussels. The acorns in particular were easy to gather, plentiful, and easy to store, and provided excellent food after the migrants had learned how to take the bitter acid out of them by treating them with lye made from wood ashes. The people who settled in the eastern woodlands soon came to depend more upon fishing and wild crops than upon hunting. They made their camps in the places where food was abundant and moved about less than the people of either the plains or the plateau. Even today the sites of many of their camps are still marked by great heaps of mussel

shells, the discards from thousands of meals through hundreds of years.

The first settlement of North America thus gave rise to three different modes of life, each suited to a particular region. The next great change here as in the Old World was brought about when the Indians developed a system of raising food instead of gathering it and thus were able to have a more settled existence. Agriculture was developed in the south and spread from there. Although, as has been said, migrants continued to filter across the Bering Strait into America, the far northern part of the continent was now free of ice and was a land of deep forests with many lakes and rivers, very much like the interior of northeastern Asia from which the migrants had come, so they stayed in this region, instead of moving southward to escape the ice as the first settlers had done, and the Indians of the United States region had no further contact with the Asiatic culture from which they had come.

The people of the southeastern woodlands seem to have gotten the idea of food raising independently and to have domesticated some of the local plants such as ragweed and sunflower. They also raised a local species of tobacco, too strong for modern tastes. However, agriculture did not become important anywhere in what is now the United States until the Indians got a combination of three crops: corn, beans, and squashes. All of these came up from Mexico and all of them seem to have reached the southeastern United States at nearly the same time. The Indians of this region called these crops "the holy sisters" and planted them together. Corn and beans were put in the same hill so that the bean vines could climb up the corn stalks, and squashes were planted between the rows to ripen after the corn was dry. In the southwestern United States the Indians got corn and squashes

some time before they had beans. These three crops together provide almost everything needed to make a balanced ration and people can live on them with very little food of other sorts. Wherever they came they changed the native pattern of life profoundly.

They also seem to have changed the older ways of living with surprising speed. Our best proof of this comes from the southwestern United States. Here the dry climate has preserved all sorts of ancient remains, including many of the logs used to roof dwellings. Since trees grow at different rates in different years, by studying and comparing the growth rings in these ancient logs, it has been possible to determine the time at which they were cut. As a result, we can now date accurately most of the changes which took place in the culture of this region. Before 700 A.D. the population was small and the people lived in scattered camps of a few families each. They got most of their food from hunting and gathering wild seeds although they raised a little corn on the side. Between 700 and 800 A.D. the corn-beans-squash combination appeared and the people turned to farming. The population increased by leaps and bounds, and all the arts developed with equal speed. Within two hundred years these people were building great apartment houses with as many as three thousand rooms, weaving fine cloth, making beautiful painted pottery, and carrying on elaborate ceremonies. In fact, these two centuries of development brought almost as many new things into the lives of the Southwestern Indians as the coming of the machine has brought into the lives of white Americans in the last two hundred years. And this culture would have gone on enriching and improving if the Indians had not been invaded and driven from their lands.

It is impossible to date happenings in other parts of America as accurately as we can those in the Southwest, but there seems to

have been the same sort of rapid transformation in the southeastern United States. The Indians here had made some beginnings of agriculture on their own, so that when they were able to get corn and beans to plant they were all set to go. They increased in numbers very rapidly and within a few generations were pushing out along the Mississippi and its tributaries, taking over the rich bottom lands and driving back the sparse hunting tribes who had held this territory. The huge mounds which puzzled the first white settlers of Ohio and other parts of the Middle West were the work of these early Indian farmers. The Indians had stopped building mounds soon after the white men came to America—why, no one knows.

Indian farming depended on corn and there were many parts of North America where this crop would not grow, as it was originally a tropical plant and needs hot, moist weather during the growing season. But the Indians developed fast-growing varieties in regions where the summer is short and drought-resistant ones in the Southwest where rainfall is scanty, and raised corn crops in places where modern farmers cannot grow corn profitably. However, the Indians were never able to grow it in Canada. In all the regions where corn would not grow (Canada, the Rocky Mountain plateau, California) the Indians remained hunters, fishermen, and food gatherers until the coming of the white men.

By the time the white men reached this continent the Indians in different parts of North America had developed different modes of life, each suited to local conditions. Along the shores of the Arctic Ocean lived the Eskimos, whose ancestors had been the last people to come over from Asia. By the time they arrived they had worked out excellent techniques for hunting the big sea animals such as the seal and walrus and for traveling by boat in summer and by dog sled in winter. Since they were used to getting most of their food from the sea, they never went inland but

instead spread eastward along the northern coasts until they reached Greenland and even Labrador. In spite of their hard life in a frozen land they developed a successful culture with many ingenious gadgets.

South of the Eskimo, in the tundra and far northern woodlands, lived wandering tribes of Indians who made their living by hunting, trapping, and fishing through the ice in winter. These people were on the edge of starvation most of the time and did actually starve in winters when the game was scarce. These people brought with them the culture of the forest and tundra people of Asia but they developed practically nothing new, since they were too busy scratching for a living to have time for invention and improvement of their lot. Each family lived by itself as a single economic unit, fishing and tending its trap lines. The various families that made up the tribes got together for only a few weeks in the summer and for the rest of the year led primitive nomadic lives.

Along the northwest coast of North America, from southern Alaska to Puget Sound, lived people who were quite different from either the Eskimo or the hunters of the northern forest. Great runs of salmon in the spring and abundant fruits and berries in the fall made this one of the best regions in America from the Indian point of view. The people here never learned to farm because they did not need crops. There was always more food than they could use, and by working hard in the spring and fall they could store up enough to last them for the rest of the year. Also, since their main source of food, the salmon, came up the river to them, they had no need to move about and could build permanent houses and develop a settled village life. They had great forests full of fine timber from which they built huge wooden houses and great sea-going canoes. They developed a high and distinctive art style and carved most of the things they used with

intricate and beautiful designs. The totem poles were made by these people. Almost every house had its totem pole. Some were as much as fifty feet high and all elaborately carved with an intricately worked series of stylized animals and legendary creatures. Some of the totem poles represented family crests, like a European coat of arms; some told stories by depicting the main characters in well-known legends. Just as we would immediately recall the story if we saw a picture of a wolf and three little pigs, so a collection of animal characters on a totem pole represented to any Northwest Coast Indian one of the tales he had heard told around the fires at night in the great houses.

These people also developed a rich and complicated religion with ceremonies which went on all during the long winter when they had little else to occupy them. The masked and richly costumed dancers came and went in the great houses, acting out their legends of doings in the spirit world and one feast followed another. The members of each tribe were divided into chiefs and commoners while at the bottom of the scale were numerous slaves, usually captives from other tribes, who did most of the hard and unpleasant work. The commoners paid dues to the chiefs, who became very wealthy, and to expend these riches a ceremony called a potlatch was inaugurated. A chief would invite a neighboring chief and his followers to a potlatch ceremony at which he would present the other chief with tremendous gifts and make other lavish and ostentatious displays of wealth. The other chief took all this, not as a compliment but as an insult, the shame of which could be wiped out only by giving a return potlatch with even more lavish gifts and greater expenditure. If he was not rich enough to do this, he lost "face" and had to acknowledge the first chief as his superior. Many of the chiefs in this region were rich even by our standards, and goods to the value of fifty thousand dollars might be given away or just destroyed at a

single potlatch. Such a contest may seem very silly to us, but the idea was not so different from that of our own wealthy families who vie with one another in giving their debutante daughters more expensive and elaborate coming-out parties.

Farther down the Pacific coast, in what is now California, the way of life was very different from that in the north. These people did not farm either, but there was abundant wild food and the well-known California climate made it easy for them to solve the problem of clothing and shelter. In fact, the costume of the California Indians was even more scanty than that seen on the California beaches today. Most houses were flimsy affairs covered with grass or slabs of bark, but each village had one large, well-made house, usually built partly underground like an old-fashioned root cellar. In this house all the religious ceremonies were held, and in a cold snap the whole village might crowd into it to sleep.

The tools and utensils of the California Indians were crudely made, but the women wove the finest baskets made anywhere in the world. The staple food was a mush made from acorn meal, supplemented by other wild plants and small game. In spite of this primitive existence this region had a denser population than most of the farming regions in North America.

The California Indians seem to have had even more local pride than the modern inhabitants of the state. Each tribe believed that the creation of the world had taken place in its own territory and could point out the exact spot where the Creator had first made an oak tree or a bear or any important object. They also believed that, after his work was done, the Creator had died, so their worship was directed not to him but to minor spirits which were still active.

East of California, the people of the Rocky Mountain plateau still lived much as their ancient seed-gathering ancestors had

lived. The food supply was so poor that not more than three or four families could stay together and even they had to move frequently, so they had no villages or ceremonials. Their society was ruled, in so far as it was ruled at all, by the old people who knew from long experience where food was to be found and by the medicine men who could cure the sick and bring luck to the hunter.

East of the Rockies, the plains were occupied by hunting and farming tribes who lived very differently from the Plains Indians of historic times, the mounted warriors and buffalo hunters who harassed the pioneer wagon trains and defeated General Custer. There were no horses in America until the white men brought them from Europe. Before they had horses, the Indians were farmers living along the river valleys as far north as corn could be grown. They built huge earth-covered houses, sometimes as much as sixty feet across and twenty feet high, grouped in villages which were often fortified with a ditch and a stockade, a pattern which the pioneers took over from the Indians when they needed to protect themselves from the aborigines. The fortifications of the village were designed to protect them from the wandering hunters who lived back from the river in small skin-covered tents. These hunters made most of their tools and utensils from bone and hide so they would not be broken in the frequent moving. They also had large fierce dogs which they used as pack animals when they traveled. The hunting tribes had been in the region before the farmers arrived and there was no love lost between them and the newcomers. Nevertheless, the two groups needed each other and the villagers traded their extra corn to the hunters for skins and meat. Some of the northern tribes had an agreement that they could visit each other's villages safely during the time a certain flower was in bloom, although during the rest of the year they killed each other on sight.

Horses reached the Plains from Mexico where they were first brought by Cortes. He had 18 horses with him when he first landed in Tabasco in the spring of 1519. The Indians who attacked him and his men were even more terrified by the horses than by the noise of the artillery; it was their first encounter with either horses or guns. They took the mounted warriors to be some terrifying new kind of man who ran swiftly on four legs and could kill his enemies at a distance by making loud noises. There is a story that, when Cortes left a sick horse behind in one of the native villages, the Indians nursed the animal back to health and worshiped it as a god of the tribe.

However, the Indians soon recovered from their awe of horses and were eager to beg, borrow, and especially steal mounts for their own use. Horses are the simplest of all property to steal since the booty itself provides a quick means of escape. There is no way of knowing how many of Cortes' original eighteen horses fell into Indian hands, but not long after the original landings, Cortes received reinforcements from Spain, including almost a thousand horses. Many of these horses wandered off when left to graze, escaped when their masters were killed in battle, or were stolen by Indians.

The next group of horses to reach America was landed in Florida by De Soto in 1539, about a hundred of them. De Soto took them with him on his inland explorations which resulted in the discovery of the Mississippi River. In crossing the river many of the horses escaped. Some migrated to the south and mated with the offspring of the Cortes truants. Reproduction was so rapid that soon wild herds of horses were common on the plains and most Indians had mounts by 1680. When the white men penetrated to the plains region, they found that the horses which their ancestors had brought had been there long before them, which

accounts for a general belief that the Indians had horses before the coming of the white men.

With the coming of the horse, the Plains culture changed almost overnight. With horses it was easy to follow the great buffalo herds and hunting became more profitable than farming. Horses also made it possible to carry more baggage on the move so the hunters could have much more commodious tents and better equipment than had been possible when they had only the dog to use as a pack animal. The farming tribes paid less and less attention to their fields and went on longer and longer hunting expeditions. Tribes who had lived at the edges of the plains now pushed out into them and various groups met, traded, and fought all the way from southern Canada to the Mexican border. Out of the mixture came a new way of life with buffalo hunting as its main support and fighting as its activity. This way of life had taken shape by the time the white men came to the Plains in any numbers and these warriors of the Plains were the last Indians to be conquered and brought under control. However, at the time that the Pilgrims landed in New England there was not a mounted redskin east of the Mississippi, nor a war bonnet of the sort in which Indian chiefs are always pictured.

The Indians tamed wild horses which they caught on the plains and raided the white men's stockades. They quickly became expert horsemen and developed their own types of saddle and style of riding. The present army saddle, usually called the McClelland saddle, is really a copy of that used by the first Indian warriors.

By the time the white men came, farming Indians had pushed their way as far north as the Great Lakes and New England. However, the real center for settled farming life was in what is now the southeastern United States. Early travelers marveled

at the size of the cornfields they saw there and the Indians did so little hunting that one traveler reported that the local inhabitants did not taste deer meat twice a year. Little is known of the life of these Indians for, just because they were a prosperous, settled, and unwarlike people, they were easy prey for the white invaders who coveted their lands and therefore they were wiped out early in the history of pioneer settlement. The tribes in this region had learned how to work copper as well as stone, how to make fine pottery and build good houses. They were the most civilized people north of Mexico; in fact, they seem to have been considerably more advanced in most of the arts than the modern Pueblo Indians are now.

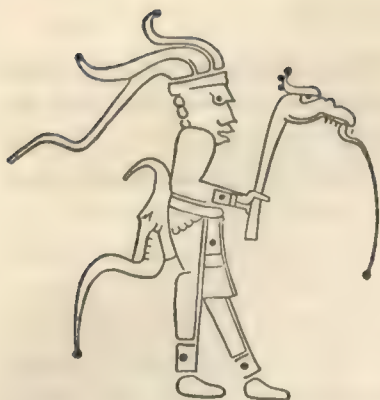
Each tribe had a religious center, a temple on a high mound with idols or a sacred fire and priests to tend it. At regular intervals the temples were repaired and the mounds enlarged in a sort of jubilee ceremony which wiped out all old grudges and debts, and gave the tribes a fresh start. When the same religious center was used for many generations, the mound grew to enormous size. One mound of this sort, at Cahokia, near the city of St. Louis, is larger than any of the Egyptian pyramids.

There were strong chiefs in this region and stable governments and, even more important, many of the tribes were organized into confederacies. Such confederacies were true democratic states whose members had been brought together by common interest, not through conquest. They had their legislative bodies with upper and lower houses much like our own, and chosen representatives of the various groups. It would seem that the ideas on which the United States has been build were abroad in America even before the white men came.

The sudden change which the introduction of farming made in the lives of the Indians of the Southwest has already been described. However, a long period of drought and hard times forced

the farming tribes to retreat from much of the territory which they had occupied and they were gradually squeezed into the small area now occupied by the Rio Grande Pueblo Indians and the Zuni and Hopi. It was at the time of this drought that the great cliff palaces of the Mesa Verde were deserted, as famine forced the people to leave their homes and move on to more fertile lands.

The Pueblo Indians contrive to make a living on land too poor to tempt the white man, so that they have been able to survive through centuries of white rule and are the only Indian tribes with a climbing birth rate, a birth rate which exceeds that of most white communities. They still farm, weave, and make pottery much as their ancestors did, although they are turning more and more to mass production for the tourist trade. Their religion is still centered on their crops and on the rain without which these crops cannot grow. The masked dances in which their prayers are embodied, are beautiful and impressive, and those who witness them may still catch a glimpse of what life was like on this continent before the white man came.



Chapter 12

ANCIENT AMERICAN CIVILIZATIONS

When we talk about Indians here in the United States we think of the primitive tribes who chipped the arrowheads which the farmer turns up with his plowshare, hunted the buffalo, and "bit the dust" in the old-style western thrillers. We do not think of Indians in the roles of empire builders or skilled astronomers or master architects, yet they were all these things in the regions south of the Rio Grande. In Mexico, in Middle America, in Colombia, and again in Peru there were great civilizations which were already at least two thousand years old when the first white men arrived. In the whole of the two Americas there were probably more civilized Indians in the time of Colum-

The drawing above shows a Maya Indian dancer. The civilized Indians of Middle America delighted in elaborate dances in which masked and costumed dancers acted out legends about the gods. This drawing of such a dancer comes from a painted jar made by the Maya Indians over a thousand years ago. The jar is in the American Museum of Natural History.

bus than there were hunting Indians or even village Indians such as the Pueblo tribes of our own Southwest.

There has been a great deal of speculation as to the origins of these American civilizations and many attempts to link them with the early civilizations of the Old World. Since the people of Mexico and Middle America built pyramids which are somewhat like those of Egypt and even buried their illustrious dead in them, also a good old Egyptian custom, some writers have held that these civilizations were started by migrants from Egypt who brought the knowledge of how to build pyramids with them. However, we can now date events in Middle America fairly well and we know that by the time the first American pyramids were built, the Egyptians had long since given up the practice. The earliest American pyramids cannot date from before 1000 B.C. or the latest Egyptian ones after 3000 B.C. Between the two civilizations there lie gulfs of time and space too wide to be bridged. Writers of another school would trace the beginnings of American civilization to China, basing their theories on certain similarities of Chinese and American art and on some resemblances in the calendars used by the two peoples. However, most of the art resemblances are more apparent than real and as for the calendars—the same moon looked down on both.

- None of these theories can explain why, if civilized people from the Old World gave the American civilizations their start, they failed to bring with them such useful appliances as the wheel and the keystone arch, or why they left behind all the plants and domestic animals on which the Old World civilizations had relied from the beginning. Other voyagers reached America before Columbus. We have all read of the Norse sailings to Vinland and there is good evidence that Polynesians reached the Pacific coasts of South America. However, these

early adventurers made no permanent settlements or conquests, and left no imprint on the American cultures. The American civilizations grew up alone, which, when you think of it, was a good deal more marvelous than any migration or conquest. We know that the ancestors of the American Indians were simple hunters and food gatherers when they arrived in this continent, yet without outside help they domesticated native plants and animals, invented weaving and pottery making, learned to smelt metals from the ore and, at last, how to build cities and live in them. Only a highly gifted race could have accomplished so much.

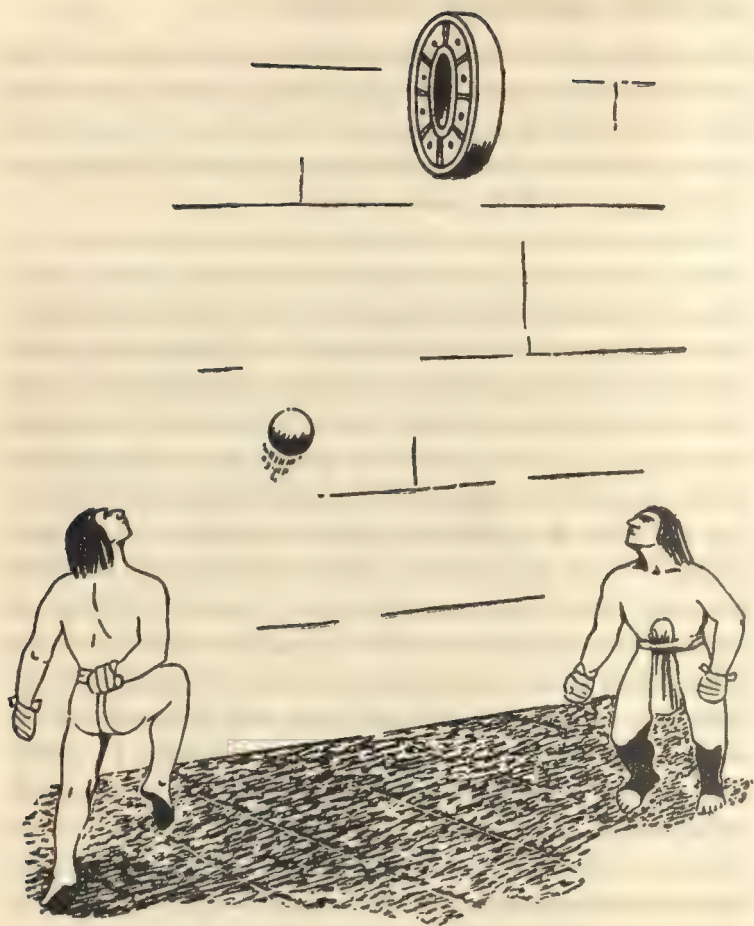
Although northern North America must have been the first part of the New World to be inhabited, civilized living did not extend north of Mexico. Even the farming Indians of our own southeast and southwest never learned to build cities. The reason for this, as for so many other things, seems to lie in the crops which people knew. The American Indians did not domesticate many animals and they never learned to milk any animals. This meant that they could only settle down and build cities in regions where they had a combination of crops which would, in themselves, provide a balanced diet.

The most important of all the American crops was corn. This seems to have been domesticated first in southern South America, perhaps in what is now Paraguay, but it spread northward from there until it reached Middle America and Mexico. In these regions it met two other crops, the kidney bean and the chili pepper, both of which had been domesticated locally. Corn, beans, and pepper together give a balanced ration on which people can live year in and year out, as many of the Mexican peasants do today. It was upon this foundation that the civilizations of Mexico and Middle America were built, although the natives of these regions were clever farmers and learned to grow

many other crops as well. They also were responsible for the good old American practice of gum chewing, for they discovered the adhesive and lasting qualities of *chicle*, the dried sap of the zapote tree. Except for the addition of sugar and flavoring our chewing gum is still the same as theirs.

It was in this region also that rubber was first used. The Toltecs, who lived in central Mexico before the Aztecs came, were the first basketball champions of the New World. They played the game in stone-walled, stone-floored courts using a solid rubber ball. The baskets were stone rings which were set in the end walls of the court vertically instead of horizontally, and since the opening in the ring was only a little larger than the ball, it took great skill to make a goal. To make the game more interesting, the losers in a real championship bout seem to have been sacrificed to the winners' gods. The Aztecs took over the game from the Toltecs and were still playing it when the Spaniards arrived. The Europeans were less astonished at the skill of the players than at the way the balls bounced. Nothing like this springy black substance had ever been seen in Europe. It was many years before any more practical use was found for rubber and, as soon as there was a brisk demand for it, plants which could produce it were found in many parts of the world. However, the American rubber has always been the best and the great rubber plantations in the Far East were developed from trees of the American variety.

There were a number of American civilizations in existence when the Europeans arrived and archeologists have discovered several others which grew, flourished, and passed before the white men came. We cannot describe all of them, but there are three of which most people have heard. These are the Aztec civilization in Mexico, the Maya civilization in Middle America, and the Inca civilization in Peru. Romantic writers have a way



ANCIENT MEXICAN BALL GAME

The ancient Mexicans played a game somewhat like basket ball except that the ball was smaller and of solid rubber while the ring was set vertically instead of horizontally. The game was played between teams from different villages and heavy bets were made on both sides. The winning team had the right to take the clothes of any spectator they could catch, while the captain of the losing team was often sacrificed, his heart being offered to the god of the winning village.

of mixing these in their stories but they represented quite different ways of life and lay so far apart that they scarcely knew of each other's existence.

The Aztecs, who occupied the Valley of Mexico when Cortes and his men arrived in 1519, were themselves new to civilization. Their ancestors had been a little tribe of barbarians who drifted down into the Valley of Mexico in the thirteenth century and settled on an island in a lake to protect themselves from the more civilized people whom they found in possession. However, the Aztecs were good fighters and they learned rapidly. In course of time they subjugated their neighbors and established an empire which was still flourishing under the ninth Aztec king, Montezuma II, when the white men came.

The Aztec Empire was a plunder empire, much like that of Assyria in the Old World. Its Aztec aristocracy lived by loot and tribute and did little to organize the subject tribes on a permanent basis. In general, they let their subjects alone as long as tribute was paid regularly. Since newly conquered tribes yielded the most loot, the empire was steadily expanded. Just before the Spaniards arrived an Aztec expedition had been sent as far south as Guatemala and, when the Aztec Empire fell, this expedition was cut off there. The Aztec warriors married local women and settled down there, and to this day their descendants have their own villages and speak the Aztec language.

Since the Aztecs lived by war it was natural for them to build up a strong military system. Every able-bodied man in the tribe was liable for military service, men needed for distant expeditions being called out in rotation. There was an elaborate system of war honors, insignia, and privileges which were accorded to warriors on the basis of the number of prisoners they had taken. The Aztec weapons were heavy javelins thrown with a spear thrower and wooden swords with sharp flakes of volcanic glass

set along the edge. These may sound like ineffective weapons, but the javelins could be thrown hard enough to drive through Spanish armor and an Aztec warrior is reported to have cut off the head of a Spaniard's horse with one blow of his sword. The Aztec warriors themselves wore armor of heavy quilted cotton, shaped very much like a union suit, and used to soak this in brine before going into battle to make it more resistant. Such armor could stop spears and arrows, but it was little help against the Spanish bullets. Warriors of higher rank wore cuirasses made from plates of solid gold, helmets carved to represent various gods, and magnificent feather capes made from the iridescent plumage of tropical birds.

This splendid kingdom and its mighty army fell an easy prey to Cortes, who landed with only four hundred and fifty men and eighteen horses. It might not have fallen so easily if the Aztecs had understood from the start who the Spaniards were and what they wanted. At first they regarded them as emissaries of the god Quetzalcoatl who was, curiously enough, represented in Aztec art as a bearded white man. The return of this god had been prophesied by the priests. They were also puzzled by the Spaniard's lust for gold. They had plenty of the precious metal but attached little value to it, counting their own wealth in carved jade and iridescent feathers. It is said that when an Aztec chief asked Cortes why the Spaniards wanted gold he answered cynically that the Spaniards had a disease of the heart for which gold was a sovereign remedy.

When Montezuma heard of the arrival of the white men he sent messengers with gifts and granted permission for them to come up to the City of Mexico. Once there Cortes seized Montezuma by treachery and the Spaniards massacred many of the nobles. The Aztecs rose and drove them out, but Cortes returned with his forces swelled by thousands of warriors from the Indian

tribes whom the Aztecs had conquered. The Aztec capital, Tenochtitlan, was taken in desperate house-to-house fighting and on August 13, 1521, the last broken remnants of the Aztecs surrendered. There were few of them left to surrender, for the Spaniards had brought with them an enemy more deadly than themselves. They had introduced smallpox, a new disease for the American Indians, and this swept away the natives by thousands.

The Spaniards justified the conquest and looting of the fabulous treasure of the Aztec Empire by saying that the Aztecs were heathen who sacrificed men to their devilish gods. This was, of course, quite true, for the Aztec believed that the gods had to have human blood to renew their strength and the gods must be strong if crops were to be bountiful and armies victorious. The victims in these sacrifices were prisoners of war. They were led up the steps of the great pyramid while thousands of thrilled and reverent spectators watched from below. At the temple which topped the pyramid six priests awaited the victim. Five of them seized him and bent his body backward over the stone altar while the sixth, with a deft stroke of the great sacrificial knife of flint, made an incision beneath the ribs, reached in and tore out the still palpitating heart. The priest held the heart aloft to the sun, then put it in a basin of incense which was placed where the fumes would reach the nostrils of the god's image. The body was then beheaded and the skull added in due course of time to a gruesome monument of skulls set up near the pyramid. The body was tossed down the side of the pyramid, to be carried off by the warrior who had captured the victim. Later it would be cooked and the flesh eaten by him and his friends at a formal banquet.

All this sounds very barbarous but to the Aztec it was a true expression of religious feeling. In spite of the horror of the Spaniards, the victims suffered none of the torture and humiliation which the Spanish Inquisition was meting out to heretics

at this time. From the moment a captive was dedicated to the god he was treated as a revered and honored person. He was invited to feasts and even given temporary wives to wait upon him. As a rule he went willingly to the sacrifice, filled with religious ecstasy, for death on the altar, like death in battle, assured his entry into the highest heaven. This was a paradise above the sky reserved for the souls of warriors and of women who died in childbirth and from this his happy spirit might return to visit the living, coming in the form of a hummingbird. Even the knowledge that his body would be eaten was not humiliating since it was eaten not from love of human flesh but in the belief that the victim had been united with the god and that the eater could thus establish a closer relation with the god himself. It was a religious idea not unlike that behind the Christian communion, except that the Aztecs were painfully literal about it.

In Middle America, in the territory which is now Yucatan, Guatemala, and Honduras, the Mayas had their seat of power. Their civilization was already of great antiquity at the time the Spaniards arrived. It seems to have emerged rather suddenly in the third or fourth century B.C. in Guatemala and Honduras, then to have passed into eclipse there and re-emerged in Yucatan, where it flourished again from about 1000 to 1200 A.D. After this it declined once more. When the Europeans came, the Mayas were still living in the shells of their great cities, but they had ceased to build or to create great art. They were invaded and partially conquered by Francisco de Montejo in 1527, but, since they had little gold and lived in difficult country, the Spanish attacks were not pushed home. The more remote villagers never accepted Christianity and finally, in the early eighteen hundreds, threw off the white control completely. Even today there is a large area in Yucatan where the Mayas are free and independent and allow no whites to enter.

Unfortunately, these modern Mayas have long since lost most of their ancient heritage. The science and learning which were the highest products of their civilization had always been limited to the priests and nobles and when the Spaniards came, their first effort was to stamp out both the learning and its bearers. In 1562 Diego de Landa, the second archbishop of Yucatan, gathered together and burned all of the ancient Maya books which were still in existence and he records that at this "the Indian sorcerers made great lamentation." Only two or three books which had been sent to Europe as curiosities survived. These have now been deciphered in part, and one of them has proved to be an astronomical treatise in which the movements of the planets, eclipses, and so forth have been calculated for a period of thirty thousand years. It leaves no doubt that the Mayas were better astronomers and nearly as good mathematicians as the Europeans who conquered them.

In spite of this crime against posterity, Landa was a good man by his own lights. He did what he could to protect the Indians from the rapacity of their conquerors and he also wrote a book about the Mayas which has become the starting point for all later studies of their civilization. In this he recorded their system of reckoning time, thus making it possible for us to date their monuments, and also set down a curious Mayan alphabet which proves that they had carried the art of writing to the point of linking particular characters with particular sounds. However, it was not until the archeologists became interested in Maya culture, fought their way through the steaming jungles of Middle America, and cleared the brush from the crumbling beauty of long-dead cities that we realized how great this civilization had been.

If, as some writers have said, the Aztecs were the Romans of the New World, the Mayas were the Greeks. Although they

fought fiercely enough, they never developed the skill in war or the devotion to war which characterized the Aztecs. Neither did they found empires. Each city lived independently under the rule of its own hereditary line of priest-kings with, at most, a few short-lived confederacies. However, these cities were the greatest in the New World. The ruins of Chichen Itzá, only one of many Mayan cities in Yucatan, cover an area of three square miles, most of which is taken up with temples and pyramids. Such cities were really ceremonial centers rather than places of residence. Most of the people lived in small villages or scattered farms, coming in a few times a year to perform religious rites. When the civilization was at its height, the various cities were joined by a system of magnificent roads surfaced with crushed stone and cement. Along these highways moved country people bringing their crops to market, merchants with their strings of slaves and bales of goods, and gaily dressed nobles borne in palanquins.

The real interest of the Mayas, like that of the Greeks, was in art and science. Even in ruin many of their temples are still of breath-taking beauty. Built of stone once covered with stucco and painted in brilliant colors, they reach skyward from the summits of great pyramids. Up the face of each pyramid runs a steep stairway designed to set off religious processions for the benefit of the multitude looking on from below. The temples themselves are a maze of carving, and Mayan sculpture ranks among the great art of all time. On the temple walls are depicted the gods with their attributes, fantastic masks, marvelously stylized serpents, birds, and flowers, and here and there the portrait of a priest presenting offerings or triumphing over his enemies. One does not know whether to be more astonished at the mastery of design or at the skill which made it possible to execute such work with stone tools, for the Mayas knew no metals except copper and gold. Even clay jars were carved with

intricate figures or painted with pictures of men and animals that show a complete mastery of line and color.

The warm, moist climate of the Mayan territory has destroyed everything except stone and metal, and most of their gold work was seized by the Spaniards and melted down in the first years of the conquest. However, the Spaniards missed one great treasure trove. The city of Chichen Itzá was built beside a pool of water formed when the roof of a subterranean cave collapsed. The water lay eighty feet below the surface, rimmed by sheer walls of rock and was itself many feet deep. According to Mayan tradition young men and maidens were thrown into this pool as a sacrifice to the rain gods. The victims were thrown in at dawn and if they were still alive at noon they were drawn up from the well and made priests. Since the fall was long and the water icy cold, few survived.

Many years ago an American named Thompson decided to dredge this well. For many weeks the dredges brought up nothing but dripping loads of mud, but one day Thompson found in the mud some amber-colored oval pellets, remnants of the incense which the Mayas offered to their gods, and knew that he had gotten down to the ancient floor of the well. From then on the dredges brought up treasure with every load, fragments of jade and turquoise, gold ornaments, sacrificial knives, and weapons with richly carved wooden handles, as well as the bones of many men and women, all young. Finally, Thompson himself went down in a diving suit to probe the crevasses of the rock bottom for further treasure. At the end of his search he had retrieved more than three hundred gold objects and innumerable pieces of carved jade and other stones, one of the greatest treasure hordes ever found by archeologists. Scientists have studied these finds for years and have learned from them a great deal about the contacts which the Mayas had with other peoples. Many of the

objects are of foreign manufacture and show that the Mayas had trade connections as far afield as central Mexico and the northern part of South America.

The third of the great American civilizations centered in Peru where the Inca Empire was flourishing at the time the Europeans arrived. The Incas, like the Aztecs, were empire builders who conquered and incorporated the other tribes of the region. They were exceedingly skillful organizers and administrators but they were inferior to their subjects in many of the arts and crafts. It is best to call the civilization of their empire the Andean civilization, using the term Incas to refer to the ruling tribe whose chief, the Inca, was also Emperor.

Unlike the Mexicans, the Andean peoples placed a high value on the precious metals. The Incas regarded silver as sacred to the moon and gold as sacred to the sun, who was their special guardian deity. Their conquering armies brought back to Cuzco, the Inca capital, the hoarded gold of the tribes they had subjugated and demanded that even more gold be mined and sent as tribute. The result was the concentration in Cuzco of a sheer bulk of the precious metal never equaled anywhere except possibly in our own Treasury vaults at Fort Knox. At the time of ceremonies the public square at Cuzco is said to have been completely enclosed by a gold chain so massive that it took two men to lift a single link. Palaces and temples were roofed and paneled with gold and all the utensils used in the emperor's service were made from it. The Temple of the Sun had a golden garden in which there were trees of gold and silver complete with leaves and fruit. Gold butterflies, so delicately wrought and beautifully balanced that they would float in the breeze, were poised above golden flowers, and gold and silver llamas browsed at the feet of a life-size golden shepherd.

We might put these tales down to the imagination of the early

Spanish chroniclers if it were not for two things. The few specimens of Andean gold work which have survived show that the Andeans were quite able to make any of the objects described. Also, when Pizarro, the Spanish conqueror, was holding the last emperor prisoner, the latter offered to ransom himself by filling a room twenty-two feet long and seventeen feet wide with gold to a depth of nine feet, and this seemingly impossible task was accomplished in a few hours. Pizarro kept the gold and killed the emperor.

While the Incas are still remembered mainly for this fantastic wealth, gold working was only one of the many accomplishments of the Andean people. No other civilization in the New World and very few in the Old World prior to the machine age approached theirs in technical skills and industry. They had learned to smelt all the metals except iron, which was lacking in their territory. They even worked platinum and alloyed bronze so skillfully that they could vary the amount of tin in different parts of the same casting. They spun thread as fine as any which we can make by machinery, dyed it in a range of colors as great as our own, and wove it into every sort of fabric known. Every type of Old World weaving was in use in the Andean region, plus a few local ones. Although they were ignorant of both glazing and the use of the potter's wheel, their clay vessels were masterpieces of design and decoration. Many of them were modeled into amazingly lifelike figures and even portrait heads. One series of vases shows the same man in youth, middle age, and old age.

In architecture the Andean peoples were less graceful and imaginative than the Mayas, but they were greatly superior to them as engineers. Their buildings give an impression of overwhelming strength and solidity. Stones of irregular outline, often weighing many tons, were cut and fitted so accurately that it is still impossible to insert a knife blade into the cracks between

them. Roads were driven for hundreds of miles through the most difficult mountain country imaginable with tunnels cut through the solid rock and chasms crossed by suspension bridges. Mountainsides were terraced for thousands of feet to make fields, and water was brought to the arid coastal plains by irrigation tunnels, some of which are over a hundred and fifty miles long. Even in their ruins the remains of this civilization fill one with wonder at both the skill and the antlike industry which went into their making.

Great as were their accomplishments along other lines, the most remarkable creation of the Andean peoples was the Inca Empire itself. Beginning with a small territory about Cuzco, in southern Peru, the Incas extended their sway from Chile to Ecuador and from the coast to the dense jungles east of the Andes. At the time the Spaniards arrived, the empire had ten million inhabitants. The Incas understood the need for good and rapid communication in an empire of this size and linked it together with a road system better than anything Europe had seen since the Romans. Since the roads were not intended for wheeled vehicles, they were narrow, but they were built to be passable in all weather. Every two or three miles along the road there were posthouses with several couriers always in waiting. As a runner approached the posthouse a new runner prepared to carry his message or burden. In this way it was possible to send a message from Quito to Cuzco, a distance of 1,300 miles through mountains, in ten days. In case of insurrection or other serious danger to the empire, messages could be sent even more rapidly by smoke signals. Each posthouse had a beacon laid ready to light.

One-tenth of the adult male population of the empire was constantly under arms and ready to be sent where needed. The common soldiers were drawn from all over the empire and all able-

bodied men did military service in rotation. Officers were drawn from the Incas themselves. Each campaign for conquest was preceded by careful planning. The territory to be invaded was spied out, roads built to the take-off points, and supplies accumulated. However, the Incas had no love of war for its own sake and used it only as a last resort when other means of bringing a tribe into the empire had failed. Actually, the Incas' rule was so benevolent and efficient that many small tribes seem to have submitted to it of their own free will. Even conquered peoples were treated leniently, although if a tribe promised to be troublesome, it would be broken up and the fragments settled in different parts of the empire, care being taken to put them on lands like those to which they were accustomed.

Whenever a tribe was brought into the empire, the sons of the nobility were carried off to Cuzco and put in the Inca school there. This school was one of the cleverest and most successful devices for maintaining control. The Incas' own sons were sent to it and both they and the foreign boys received the same training. The foreign boys formed friendships with Inca boys and, when they grew up, were often given Inca wives. In due course of time they were sent back to rule their own people thoroughly sold on the Inca control. The Inca boys in the school were carefully watched and the ablest selected to become administrators of the empire.

The Inca Empire was really the first totalitarian state in history. It had all the advantages and disadvantages of such a system. There was no unemployment and no want. Taxes and demands for labor on public works were adjusted to what the various communities could stand without hardship. New colonies and villages whose crops had failed were taken care of by issues from government stores. Artists and craftsmen of unusual skill were

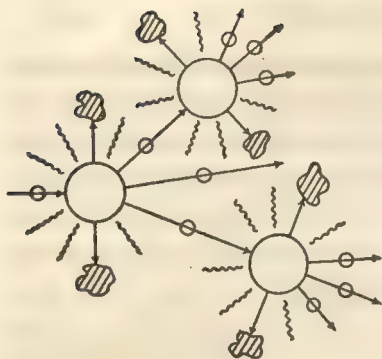
supported by the state and allowed to create without financial worries. There were even state-subsidized troupes of actors who went from town to town to amuse the people.

On the other side of the picture, everyone in the state was subject to rigid discipline and had to give unquestioning obedience to the orders of his superior. There was no private enterprise of any sort, except for the small bartering which went on in village markets. The whole population was organized into units with an official in charge, the smallest of these being a group of ten families, then of a hundred, then of a thousand, and so on up the scale. The official in charge of each unit was personally responsible for the behavior of those under him and the whole pyramid apexed in the Sapa Inca, the Divine Emperor, Brother of the Sun. Daily life was rigidly regulated and the individual had no choice even in his marriage, except that when the order went out for so many marriages in a particular district, the proper number of young men and women would be brought in, put in an enclosure, and allowed a couple of hours in which to pair off.

Such a system was fatal to initiative and the weakness of the empire became apparent as soon as it had to protect itself from Europeans. Pizarro landed in 1531 with a force of only 183 men. He came at an unfortunate time for the Incas, for there were two claimants to the throne and rebellion had already broken out in the north. By playing one side against the other with calculated treachery, Pizarro was able to overthrow the whole elaborate structure of rule and seize control for the Spaniards. There were a few desperate revolts even as late as the eighteenth century, but the whole civilization was crushed and the Andean Indians became peons on Spanish estates.

The American civilizations have left little imprint on world history, but the descendants of the people who created them are

certain to play an important part in the future of Latin America. Although their ancestors were conquered, they were not destroyed, and their blood flows in the veins of a large part of the Latin American population. In view of the greatness of their past accomplishments, we may be sure they will contribute to the development of the new civilization which is now taking shape around science and the machine.



Chapter 13

THE LAST MUTATION

Before the machine came to bring about the last great mutation in the lives of men, the Old World civilizations were fundamentally very much alike. Everywhere the chief pattern of life was agricultural and all manufactures were handicrafts. Wind and water power might be harnessed to perform simple, monotonous tasks, such as grinding grain and lifting water into irrigation ditches, but nothing was made by machinery. The economy of the world depended on the strength of men's muscles, with a little help from the animals (the ox pulling the plow, the donkey carrying burdens), and the craftsmanship of the world depended on the cleverness of human hands in shaping wood or forging metal or modeling clay.

Each of the great civilizations, to be sure, had developed along

The diagram above shows the splitting of an atom of Uranium 235. Man's achievement in the release of this energy opens a new era in his history.

the lines laid down by its dominant interests and seemed at first glance quite different from the others. Each of them excelled in some branch of manufacture. The Chinese were the only people in the world who knew how to make fine porcelain, a ware so much better than anything Europe had that to this day we still call all our fine crockery "china." The Islamic people specialized in weaving, and we still speak of damask, named after Damascus, and of calico, named after Calicut in India.

Though each civilization had its specialty, the knowledge of such things as pottery and weaving were ancient, and all peoples made use of them with varying degrees of skill. Techniques were developed by chance, not by scientific experiment, and often the formulas for doing things had much the quality of magic rituals, for along with the few things needed for successful operation, they included a lot of other things which had nothing to do with the case. The iron-smelter's apprentice was taught how to build his furnace in a certain way and how to pack ore and fuel into it, but he was also taught that he must go through certain ceremonies and sacrifices before he began the work and that he must wear a certain kind of clothes or the finished product would not be right. If, as in one old Japanese formula for putting a gun-metal finish on steel, the rule prescribed the ashes of eels caught at the time of the full moon, no one ever thought of experimenting to see whether or not ashes of eels caught at some other time would do just as well, or, more daring still, whether ordinary ashes would give the same result.

The basic patterns of social and economic organization went back to the same remote past and were carried on by the same rule of thumb methods. At the foundations of all the Old World civilizations lay the peasant plowing the land with his ox while his wife kept house, tended the children, and wove a little cloth in whatever time she had left. In city and country alike the work-

ing day was set by the sun. It began as soon as it was light enough to see to work and ended when it was too dark to work any longer. The little surpluses produced by the unending toil of the peasants and craftsmen went to the support of the small ruling group, priests and nobles, who had a monopoly on education and the finer things of life. This ruling group took the same benevolent interest in the well-being of the peasants and craftsmen that the farmer took in that of his ox. The common people looked to them for guidance and protection and the nobles recognized the obligation and took care of the commoners.

It was only when the nobles failed to fulfill their obligations or when times were unusually hard and the peasants began to starve that the commoners ever grumbled about their lot. They regarded this life of toil, which they inherited from their fathers and passed on to their children, as just in the nature of things, no more to be questioned than that spring followed winter. Before the machine age there had never been enough food and goods in the world to provide everyone with what we today would regard as a decent standard of living or the amount of leisure we think necessary for happiness.

Although the common people toiled endlessly, each civilization had through thousands of years worked out ways of compensating them and keeping them contented at their labors. The nobles provided feast days for them to look forward to, religious ceremonies staged with such pomp and ceremony that they were as good as a play, and the visits and journeys of the nobles through the countryside were managed with such a fine sense of the dramatic that the local peasantry found them as exciting as a circus parade and took so much satisfaction in knowing that their lord outshone the lord of the next county that they did not begrudge paying the taxes which made the show possible. If there

was no luxury for the commoner, there was also no unemployment. The same rigid system which kept him from rising from the station in which he was born also gave him security in that station. He undoubtedly had fewer worries and more real contentment than the modern factory worker.

The breakup of this ancient system began with the appearance of two basic inventions which promise to be as far-reaching in their results as the earlier invention of food raising. These inventions were, first, the scientific method, and second, the use of heat as a source of power. Both were made in Europe, although why they should have developed there first there is no way of telling.

All of us have been raised on European history and taught to think of Europe as the center of the civilized world. Actually, until these inventions, Europe was an outpost of civilization. It had none of the rich river valleys which were the background of the first great cultures and, until fairly recent times, its population was small and scattered. The Roman Empire at its greatest extent had fewer people than the Chinese Empire at the same period. Until four hundred years ago the only significant contributions Europe had made to the development of civilization had been those made by the Greeks.

The Greeks were a people with insatiable curiosity. They observed and recorded and speculated about everything in their universe. Almost any modern scientific theory can be found foreshadowed in the teaching of one or another of the Greek philosophers, and the system of mathematics the Greeks evolved has been invaluable to scientific advance. However, the Greeks were so thrilled by the discovery of what the human mind could do and by their concept of logic that they never checked their findings nor understood the extent to which logic is built on

the things people believe without realizing that they believe them, or the way that wishful thinking can make us believe we see the things we are looking for.

The essence of the scientific method is that the scientist does not trust his own observation. He knows that it is quite possible for him to fool himself, especially when a particular result would fit in with one of his pet theories. This attitude is really more important for science than the technique of experiment. The Greeks made plenty of experiments, but once they had achieved the result they were after, they stopped. The modern scientist tries the same experiment over and over again and keeps careful records of the results so they can be compared with those of other scientists. Since he knows that machines are not influenced by wishful thinking, he uses as many mechanical aids as he can to check on his observations. Immediately other scientists repeat his experiment and devise new experiments to check on the first one. The results may seem contrary to previously understood logic, but they are established and can serve as a starting point for further work.

Between the Greek foreshadowings of science and the emergence of modern science, there was an interval of about two thousand years during which the European mind underwent a subtle preparation for welcoming the scientific method. The direct observation and free speculation of the classical Greek period gradually gave way to the rule of authority. During the Middle Ages, no conclusion was regarded as sound unless support for it could be found in the writings of earlier scholars, and religion exalted simple faith and willingness to believe as paramount virtues. The fallibility of the individual and the danger of relying on intellect alone were dinned into our ancestors for centuries. With the Renaissance and Reformation, faith in authority was lost but distrust in the intellect survived. Out

of this distrust grew the system of mechanically checked and carefully recorded experiments upon which modern science depends.

Modern science might be said to have begun with Leonardo da Vinci, who lived from 1452 to 1519 and was a true scientist who would have felt at home in a modern laboratory. However, the first working steam engine, which ushered in the machine age, was not built until 1765. During the three hundred years between da Vinci's experiments and the creation of the steam engine, science developed slowly and, for most of the period, it had very little effect on the daily life of the European people. Peasants still tilled their fields as their ancestors had done and craftsmen carried on with their ancient methods. If the common people knew of the scientists at all, they thought of them as magicians, and probably evil ones.

This was the great period of European discovery and expansion, but while their ships were venturing into new lands, their technology was still much the same as that of the other Old World civilizations. Since one of their dominant interests was in shipping and navigation, they were able to undertake the long voyage across the Atlantic to reach the New World. Once they had reached these shores, their armor, swords, and guns gave them an easy victory over even such great and wealthy nations as the Aztecs and the Incas, and golden spoils began to flow back to the mother country in a rich stream.

However, at the very time that the Europeans were conquering the American civilizations, their own homelands were in desperate danger from Asiatic attack. The Turks, who had inherited the Islamic civilization of the Near East, were the greatest military power of the period. They equaled the Europeans in armament and surpassed them in discipline and knowledge of military science. A hundred years after Columbus the Turks were

still overrunning central Europe and raiding the shores of Italy.

The most important changes which took place in Europe during this period were not technological but social. With the opening up of new trade routes and markets, and the inflow of gold from America, the feudal system received its death blow. There was more wealth to be gained from commerce than could be made from exploiting the peasants on the estates, and, even more important, one did not have to be born a noble to have a share in the new prosperity. Any bold and venturesome man could set out to make a fortune in the New World. People began to flock to the cities and power passed from the hands of the feudal aristocracy into that of a new aristocracy of merchants and bankers, practical men, only a generation or two removed from craftsmen and peasants. Although the attitudes of the ancient Greek aristocrats had stifled all attempts to put the findings of science to practical uses, these new aristocrats were eager to put scientific findings to use wherever they would increase profits and production. By the eighteenth century the stage was set for that combination of applied science and power-driven machinery, which is the basis for present-day civilization.

With the invention of methods of getting power from heat, the third great mutation in human history really got under way. The first effect of this invention was to make power available wherever there was fuel and to provide it in hitherto undreamed of quantities. The machinery required huge quantities of metal and put a new value on coal, which had previously been regarded as a questionable substitute for firewood. As late as the American Revolution there were still people who doubted that hard coal would burn and dealers were fined for selling it as fuel. Those parts of the world where abundant deposits of coal and iron were within easy reach of each other now became the most valuable and important. They occupied much the same position with

regard to the new civilization that the rich river valleys had occupied in the old one. Europe had many such deposits and so had America. Since the white people were the first to use science and power, they got a head start on the rest of the world (the real basis for the theory of white supremacy) and their natural resources of coal and iron have made it possible for them to hold their lead.

How rapid and revolutionary were the changes the machine brought to human living can best be shown by imagining that the spirit of George Washington could journey backward and forward in time and space to pay visits to the court of Hammurabi, King of Babylon in 2000 B.C. and to the present White House in the modern city named for him. For the former visit he would have to go back 3700 years from his own time; for the latter he would have to go forward only 200 years; but there is no doubt that, except for the matter of language, Washington would be more at home and see more things that were familiar to him in the court of the Babylonian king than he would in a modern American city.

The father of our country would probably feel he had landed on another planet if he could visit his children now. Washington never saw a building more than four stories high, unless it were a church spire, so that the Babylonian palace would be much less astounding than a skyscraper. The lamps and torches, the charcoal fires in Hammurabi's kitchen would be more familiar than electric lights and gas stoves. Washington would be much more at ease in Hammurabi's chariot than in our president's automobile. He never heard of a germ or a serum or an allergy and wouldn't know what a modern doctor was talking about, but if he had become ill at the Babylonian court and been attended by the royal physician, he would have been bled and dosed with much the same impressive but ineffective remedies that he was

accustomed to in Virginia. The unpaved streets, the cheerful unconcern for sanitation would not bother Washington, for the situation was much the same in colonial America.

Even the organization of Babylonian society, with its slaves, peasants, rich merchants, and hard-riding, hunting nobility, would have struck a familiar note for the Virginia aristocrat. He might have shaken his head over the king's claim to rule by divine right, but he would also have remembered that the same idea was still prevalent in many parts of Europe in his own time. As a good Episcopalian he might also have disapproved of the great establishments of the local god and the sportive ladies who contributed their earnings to its upkeep, but he would never have questioned the right of the temple to levy taxes.

Most of the things we have mentioned which would have been strange to Washington have to do either with machinery or medicine. In its dealing with the new mutation our own civilization has followed the way of all civilizations and driven ahead along the lines of its dominant interests. We have wanted more machines, more and better goods, and better health, and we have achieved these goals. Our standard of living has risen to heights that a feudal peasant would never even have dreamed of. Even an American living on relief during the last depression enjoyed a degree of comfort which was possible only for the rich three hundred years ago. Three hundred years ago the infant mortality in European royal families was higher than that in the worst American slum. All in all, we have gone very far toward getting what we want and we can point with pride to our achievements.

Unfortunately, there have been many other things which we needed but, because these things were not along the lines of our dominant interest, we have not realized that they were necessary nor made use of the modern methods of science to help us get

them. The changes going on in our technology are the most extensive which have ever occurred in human history, and far-reaching changes in technology always result in changes in the organization of society. However, we have made little conscious effort to change the rest of our culture to adapt to the new conditions. Our social and political institutions would be quite familiar and understandable to George Washington even though the rest of our living would astound him. We have patched and bolstered up old institutions when they seemed to be approaching a breakdown, but even in this we have failed to use the methods of modern science for investigating what is actually happening to these institutions or to turn to the findings of social science for help in long-range planning. In fact many people still question whether such planning is possible.

The social sciences (sociology, economics, anthropology) are the newest of all the sciences and are still looked at somewhat askance. This is partly because their work lies outside the current of our technological interests, partly because these sciences cannot use many of the techniques of the physical sciences. No one can put a society in a laboratory and try controlled experiments on it. However, the social scientists have their own techniques of observation and comparison and they are already sure of certain things. They know that, in the whole course of human history, no society has ever succeeded in returning to an earlier way of life when change has gotten under way. After a period of growth and prosperity, a society may become impoverished and its culture may break, but it does not go back to the state in which it was before the growth began.

The social scientists also know that the future of any society is not fixed. At any point in its history there are a number of different ways along which it can go. Civilizations are flexible things and, although their parts have to be adjusted to one another,

several different patterns of adjustment are always possible. Human beings are amazingly tough and adaptable and they can learn to live under almost any social system which will keep them fed, clothed, and sheltered. However, they will be much happier under some systems than under others. The great advantage of living in a democracy is that we can do something about reorganizing our society, once we recognize that there is a need for reorganization.

The recent discovery of how to make use of atomic energy holds potentialities for the most far-reaching changes that the world has seen since the invention of the steam engine. However, at present our knowledge of it is meager and it will be some time before this terrific source of power can be harnessed in such a way as to be a dynamic factor in everyday economy. When that time comes it may well bring about the fourth great mutation in human history. At present, however, the power of this new basic invention is largely political, since its tremendous destructive possibilities must force nations to revise their attitudes toward war. People used to think wars were inevitable because fighting is a natural human instinct, which is a dubious statement in itself. However, since the airplane, the tank, and now the atomic bomb, the character of war has changed so much that the old attitudes must be broken down if we are to survive. What changes atomic energy will bring to the lives of generations to come is a speculation which has no place in this book, but unless we are so mad as to use its destructive power to blow ourselves up, we may be sure the world will go on changing and developing and making life richer and longer for the individual.

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